AUGUST 1954

FOUNDRY

...WHEREVER METALS ARE CAST

V82 #8

FOUNDRY MECHANIZATION
Recent Developments—p. 70

HOT TEARING OF CASTINGS
Stress vs Strain—p. 76

SAFETY IN FOUNDRIES
It Can Be Achieved—p. 80

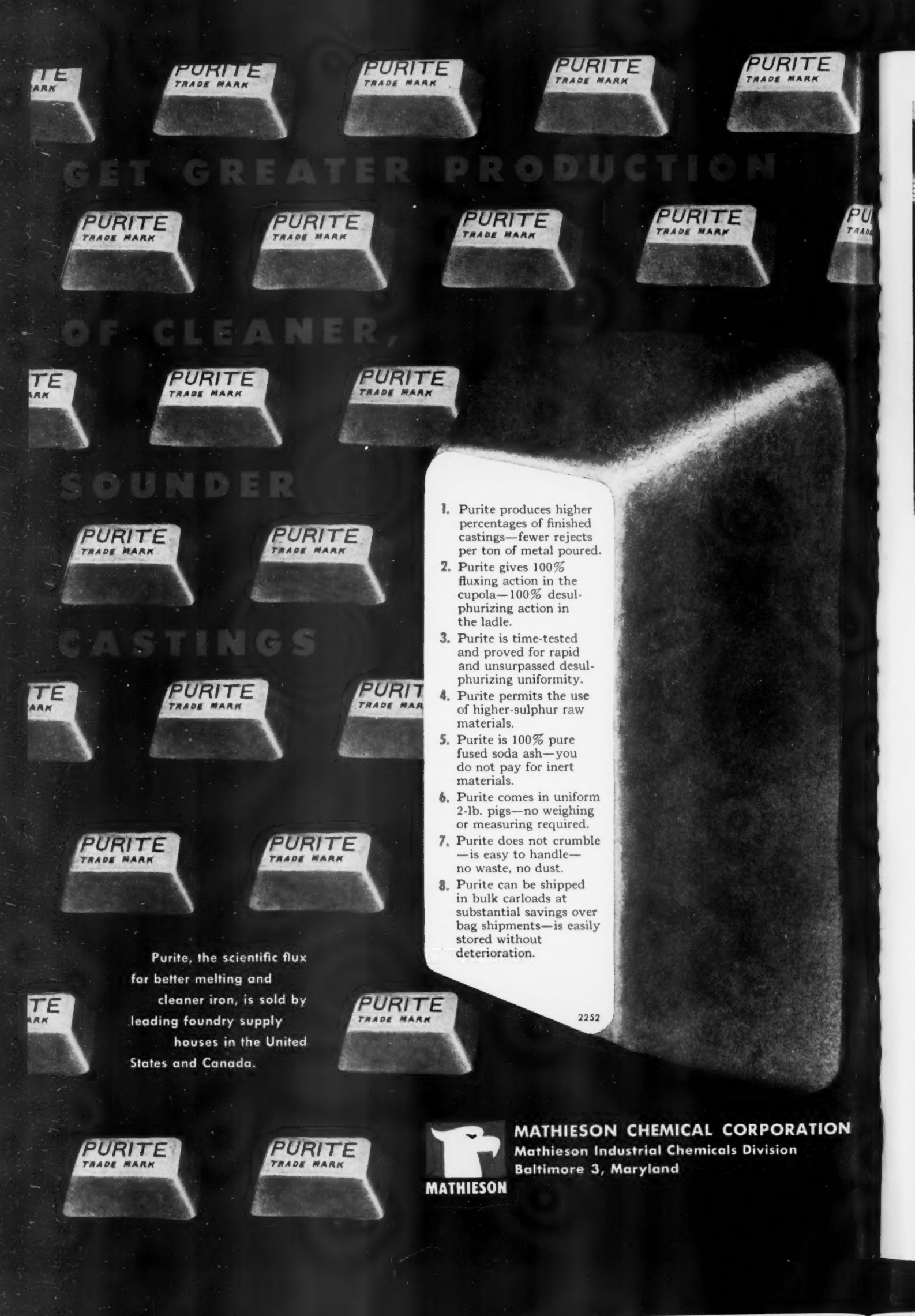
INDUCTION MELTING
Effect of Frequency—p. 84

FLOATING FOUNDRIES
They Serve the Navy—p. 88

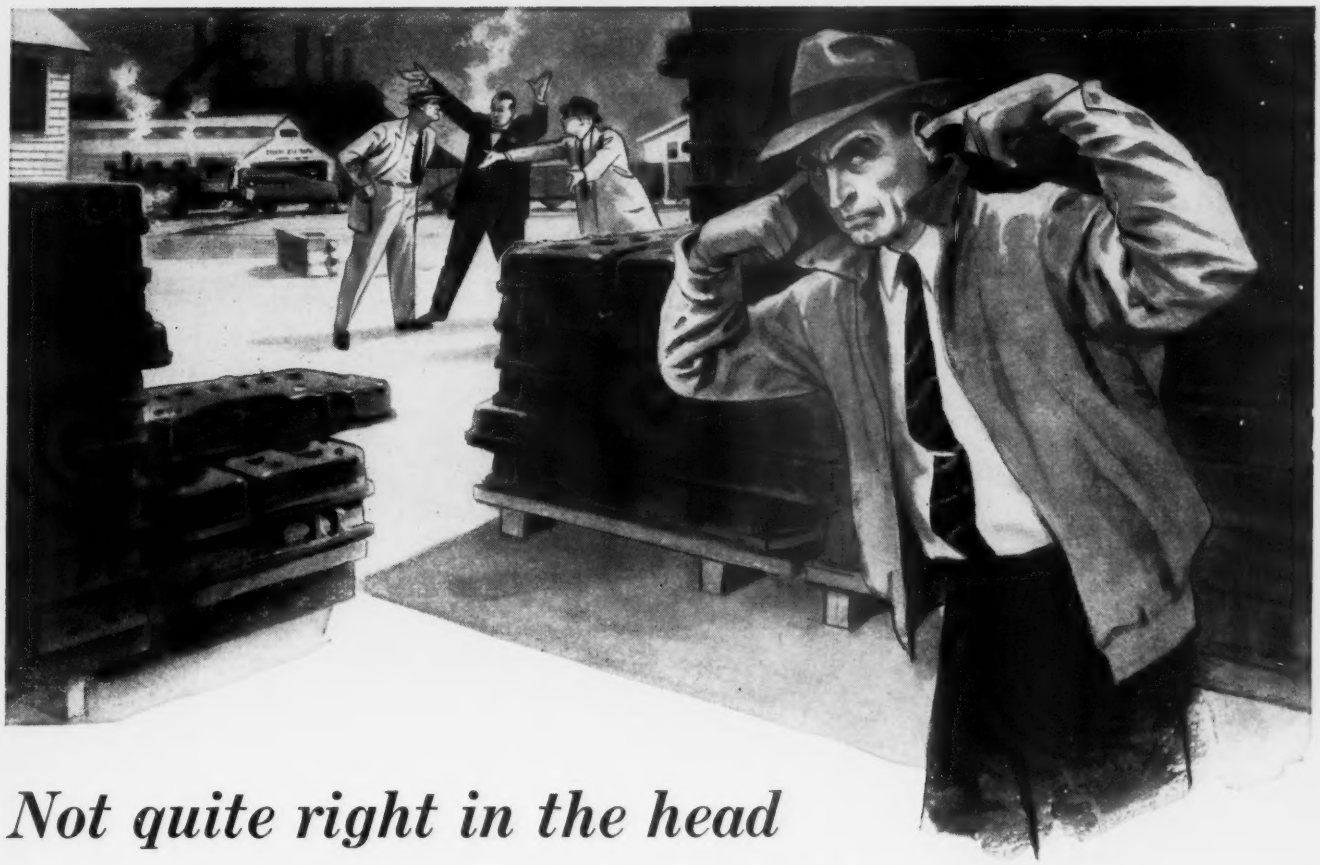
SOUTHERN FOUNDRY
65 Years of Progress—p. 90

INVESTMENT CASTING
Facilities Expanded—p. 94

CONTENTS—p. 3


PURITE
TRADE MARK
GET GREATER PRODUCTION
OF CLEANER,
SOUNDER
CASTINGS
1. Purite produces higher percentages of finished castings—fewer rejects per ton of metal poured.
2. Purite gives 100% fluxing action in the cupola—100% desulphurizing action in the ladle.
3. Purite is time-tested and proved for rapid and unsurpassed desulphurizing uniformity.
4. Purite permits the use of higher-sulphur raw materials.
5. Purite is 100% pure fused soda ash—you do not pay for inert materials.
6. Purite comes in uniform 2-lb. pigs—no weighing or measuring required.
7. Purite does not crumble—is easy to handle—no waste, no dust.
8. Purite can be shipped in bulk carloads at substantial savings over bag shipments—is easily stored without deterioration.
2252
Purite, the scientific flux for better melting and cleaner iron, is sold by leading foundry supply houses in the United States and Canada.
MATHIESON
MATHIESON CHEMICAL CORPORATION
Mathieson Industrial Chemicals Division
Baltimore 3, Maryland

(Advertisement)



Not quite right in the head

...or how Chuck Wright treats head-trouble that hurts in more ways than one

"A company I'd nominate as one of the best also came desperately close to being one of the worst," declared Chuck Wright, foundry specialist for the INCO distributor.

"I mean the Ideal Company. Before the Korean War," continued Chuck, "they poured tons of complicated cylinder head castings for Diesel engines. And to get the high strength and density needed to handle Diesel pressures they cast the heads in gray iron containing 1 to 1.5% nickel. From cupola to shipping dock, conditions of control were tops . . . rejections, minimum.

"But shortly after fighting started in Korea, rejects began piling up so fast you could almost see overhead poppin' through the ceiling. Actually, you could see Max Long, the foundry Supt., suffering from a special kind of headache. For Max paced 'round and 'round his desk, muttering to himself with gestures, like a candidate wanted by guards in white coats.

"In fact, Max and all other foundrymen who made complicated cylinder head castings at that time began to break records for rejections. Max's soared up to 20%, and in some plants making the most complex designs, I heard they went even higher. Why? Because the foundries turned to conservation measures, including restricted use of nickel. In some iron it was dropped to .5%, but usually to no nickel at all.

"As you know, if you fill intricate molds with unalloyed gray iron, the matrix structure is primarily dependent upon the cooling rates of the various sections. Light sections cool faster than heavy ones, and surfaces cool faster than midsections. That's the reason so many of those cylinder heads showed cracks or were leakers.

"I said as much to Max. However, he refused to believe that a small addition of nickel was the answer.

"You see, in cylinder heads or any complicated designs that must withstand high pressures, you need additions of nickel back to the old level of 1 to 1½% to get a uniform metal structure. A uniform structure minimizes rejects. And you get not only pressure tightness, but castings that are easier to machine.

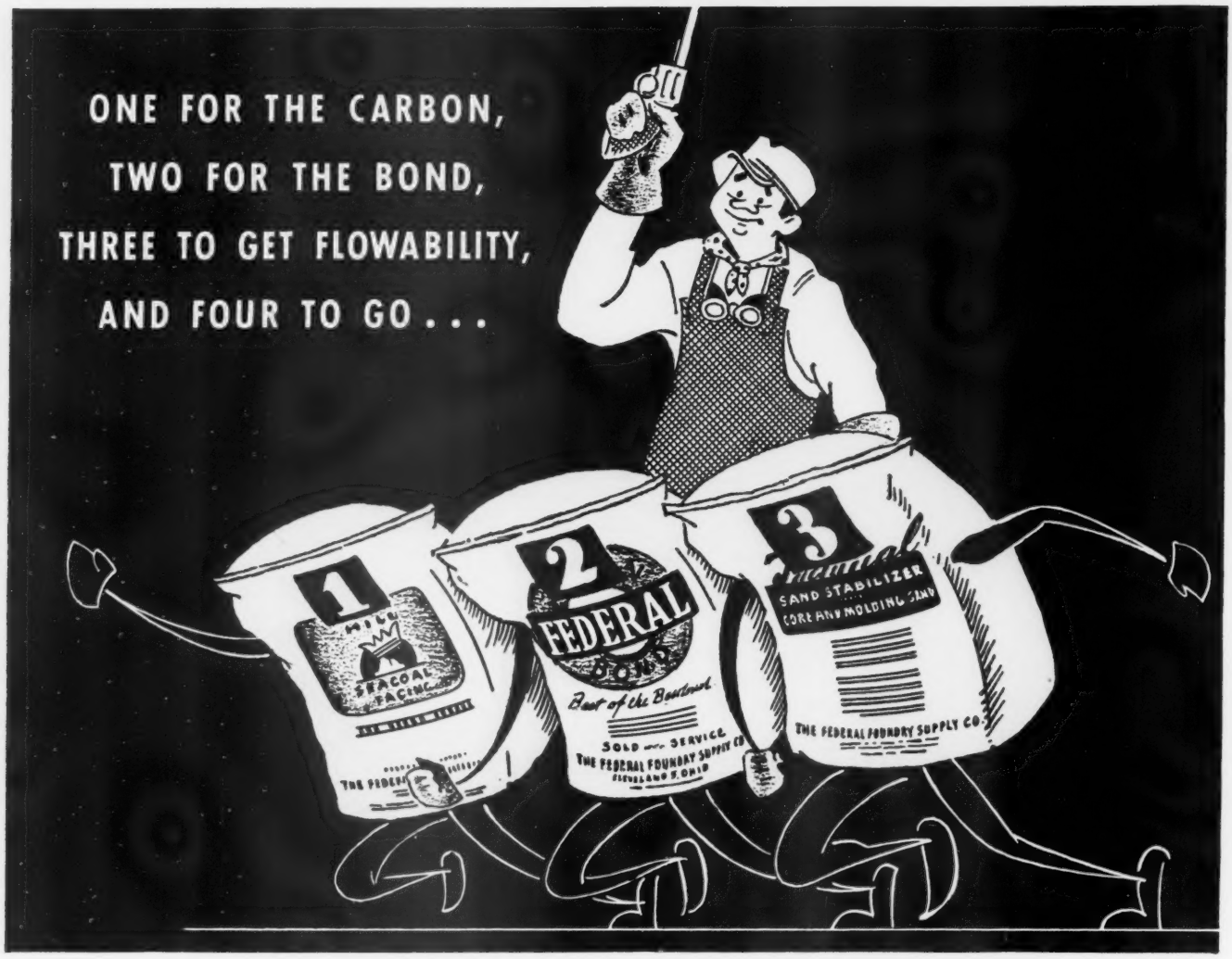
"Finally he acted on my advice and returned to his pre-Korea practice of using nickel, after which rejects dropped 'way down again. I can't understand why foundrymen minimize the importance of a little nickel, or suffer so when the remedy is so simple. But that's the way it is.

"However, with rejects under control again at the Ideal Company, Max can show you how to treat head trouble. But if you want to talk to a man who gets around a lot, see me. Whatever your problem, if it has anything to do with casting, drop me a line. I'll be glad to help, anytime."

Chuck Wright

The International Nickel Company, Inc.

67 Wall Street New York 5, N. Y.



. . . FOR BETTER SAND PREPARATION!

When it comes to preparing molding sand—there's no better way, no easier way, no more dependable way—than the Federal way! By simply adding Federal CROWN HILL SEACOAL, Federal GREEN BOND BENTONITE (pulverized or granular) and Federal SAND STABILIZER to your sand in varying amounts, all the important sand characteristics can be closely controlled and easily changed to satisfy specific requirements. You get *extra* advantages, too—lower cost, more uniform mold hardness, better shakeout, better finish and more readily saleable castings. Plus this mighty important fact—the three additives will cost you *less than $1.00 per ton of castings produced!*

There's a new Federal bulletin on the preparation of molding sand, that hundreds of foundrymen have found extremely helpful. A copy is yours for the asking. Write for it today!

IMPORTANT
FOR SLURRY USERS!

If you use the slurry system of sand bonding, you'll want to learn about Federal's #1200 Slurry Grade, Granulated Green Bond Bentonite . . . and how it's used with Crown Hill Seacoal and Federal Sand Stabilizer to make the perfect slurry. We'll gladly consult with you or send complete information.

FEDERAL

Make your foundry a better place in which to work!

The **FEDERAL FOUNDRY SUPPLY** *Company*

4600 EAST 71st STREET, CLEVELAND 5, OHIO

CROWN HILL, W. VA. • CHICAGO • DETROIT • MILWAUKEE • RICHMOND VA. • ST. LOUIS • CHATTANOOGA • NEW YORK • UPTON WYO.

IN TWIN CITIES: C. D. Gallaher Company, 428 Stinson Blvd., Minneapolis

FOUNDRY

August 1954

Volume 82—Number 8

Let's Talk Castings! (Editorial) 69

SPECIAL ARTICLES

Developments in Foundry Mechanization 70
Here are some of the problems and steps to consider in formulating a materials handling system in any foundry—By R. J. Geitman

Stress vs Strain in Hot Tearing 76
Stress and strain factors are considered and author suggests the possibility of a strain concept of hot tearing—By J. B. CAINE

Safety Works—If You Work at It 80
Plant safety will work if management and employees join in instituting and applying a planned program for accident reduction—By H. A. FORSBERG

Effect of Melting Frequency on Induction Melted Aluminum Alloys 84
A comparison of properties of different alloys melted in gas-fired and electric induction furnaces—By A. SAIA, S. LIPSON and H. ROSENTHAL

Floating Foundries 88
Foundries aboard U. S. Navy ships can produce castings to meet maintenance, emergency, and damage requirements—By LT. J. T. BOLT and W. H. BAER

Southern Foundry Marks 65 Years of Progress 90
Progressive policies and modern production and marketing methods have aided Ross-Meehan Foundries' growth during last half century—By W. G. GUDE

Foundry Completes New Investment Casting Facilities 94
Howard Foundry Co. is producing close-tolerance investment castings in revamped and enlarged Milwaukee plant formerly owned by Allis-Chalmers

Seen at the Foundry Show 115

I-H Producing Shell Mold Castings 126

Man-to-Man By RALPH L. LEE 146

Mechanization Raises Efficiency By DELMAR JOHNSON 212

MEETINGS

ASTM Annual Meeting By EDWIN BREMER 128

IBF Annual Meeting By VINCENT DELPORT 135

Malleable Founders' Annual Meeting By F. G. STEINEBACH 152

NEWS FEATURES

Around the Country	141	**Late Foundry News**	33
Calendar of Meetings	144	**Men of Industry**	104
Foundry Group Activities	184	**News Views**	174
Industry Briefs	170	**Obituary**	162

REGULAR DEPARTMENTS

ABC of Foundry Practice	224	**Questions and Answers**	98
Data Sheet	149	**Readers' Comment**	66
Foundry Developments	181	**Statistics**	131
How To Do It	166	**Trade Publications**	239
Ideas for Foundrymen	199	**Trouble Shooting**	176
New Equipment and Supplies	196	**With the Editors**	10

Business Staff—page 261 Classified Advertising—page 252 Advertisers' Index—page 261

EDITORIAL STAFF

FRANK G. STEINEBACH
Editor

WILLIAM G. GUDE
Managing Editor

EDWIN BREMER
Metallurgical Editor

ROBERT H. HERRMANN
Associate Editor

JACK C. MISKE
Assistant Editor

KENNETH L. MOUNTAIN
Assistant Editor

BYRON E. KENNEL
Assistant Editor

VIRGINIA C. TAYLOR
Assistant Editor

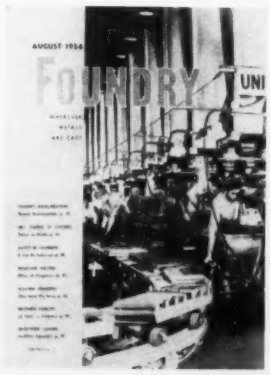
VIRGINIA B. HARMS
Assistant Editor

DON S. CADOT
Art Editor

New York ..... B. K. PRICE
L. E. BROWNE, SAMUEL W. BAKER
Detroit ..... FLOYD G. LAWRENCE
Pittsburgh ..... ROBERT M. LOVE
Chicago ..... ERLE F. ROSS
Washington ..... E. C. KREUTZBERG
London ..... VINCENT DELPORT

ADVISORY STAFF

JOHN W. BOLTON
ALBERT E. GROVER
HARRY A. SCHWARTZ
BERNARD P. MULCAHY

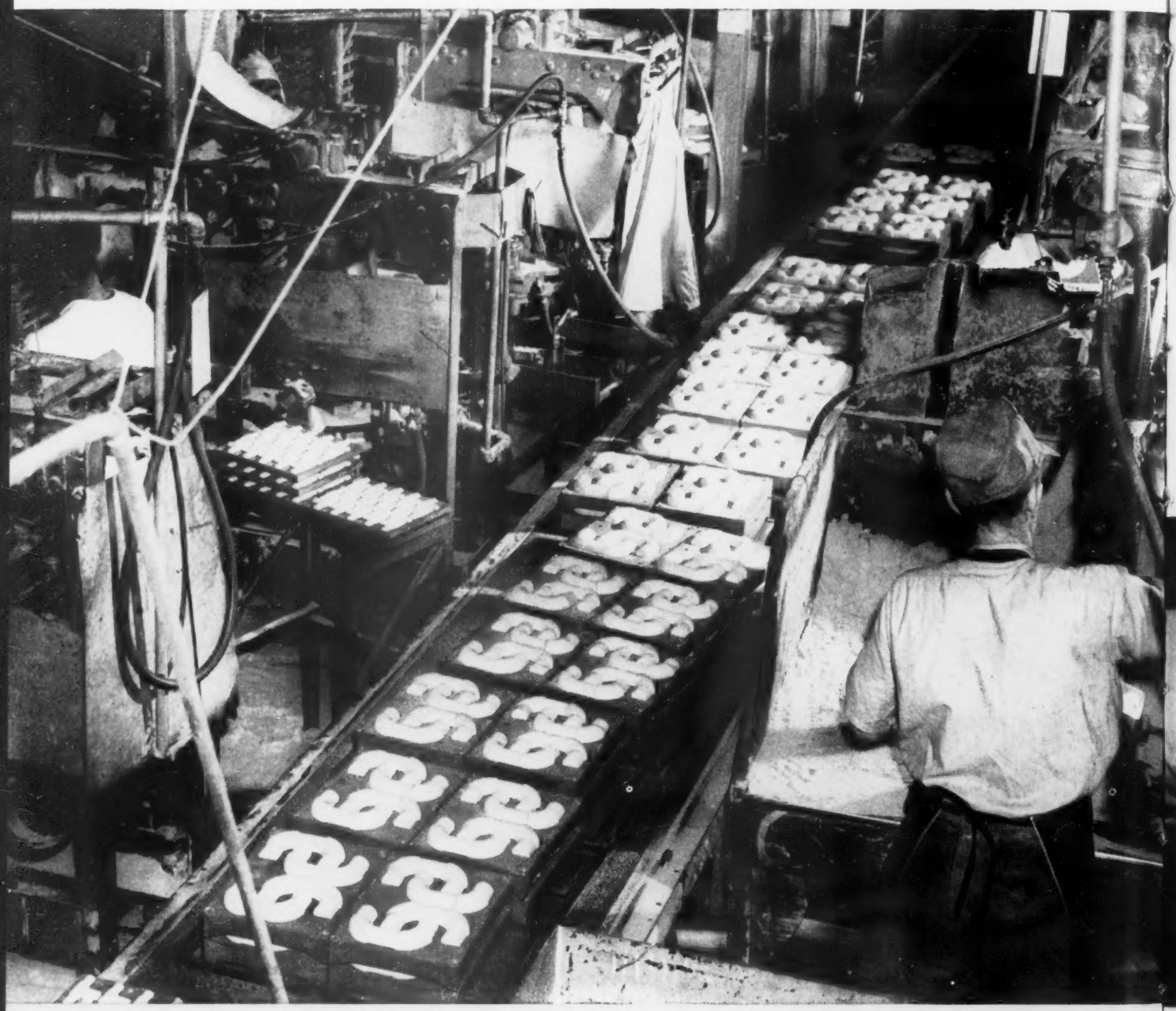


THE COVER: A mechanized molding line of a type similar to those discussed in story that starts on page 70. Photograph courtesy of the Link-Belt Co.

Published monthly by the Penton Publishing Co., Penton Building, Cleveland 13, O. Subscriptions in the United States, possessions and Canada, one year $5; two years $8. Other foreign countries, one year $10. Single copies 75 cents. Copies published three or more months previous to date of current issue $1. Entered as second class matter at the postoffice, Cleveland, O., under the act of Mar. 3, 1879.

Copyright, 1954, by the Penton Publishing Co.

In *UNION Cores there is strength...



Central conveyor belt, straddled by high speed blowers on one side and hand ramming benches on the other, feeds cores to continuous tower oven. 85% of the cores are blown.

THE UNION MALLEABLE MANUFACTURING CO., *Ashland, Ohio

ARCHER • DANIELS • MIDLAND COMPANY

FOUNDRY PRODUCTS DIVISION • 2191 WEST 110th ST. • CLEVELAND 2, OHIO

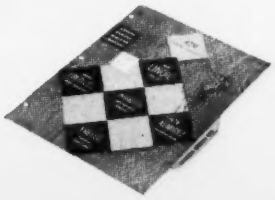
th...with LINOIL

Less than 1% scrap from core failure . . . speaks well for a core room that serves two subsidiary foundries, one pouring malleable iron fittings and the other brass.

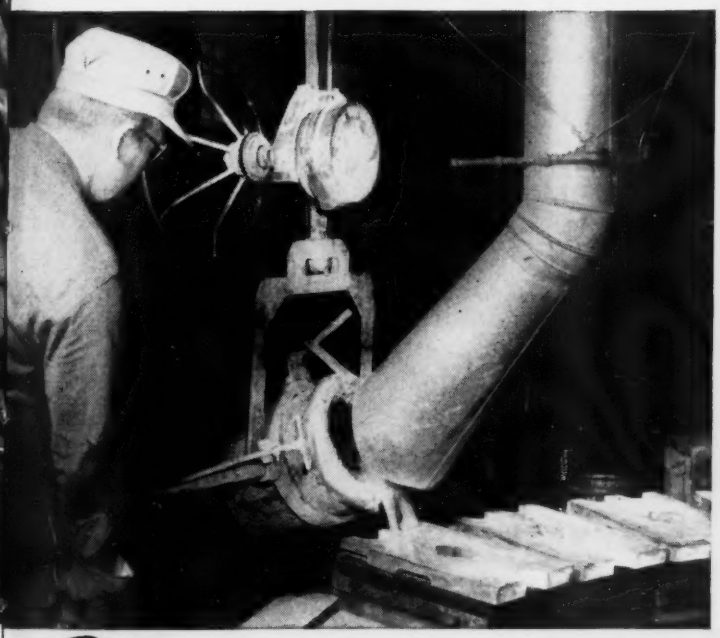
Union Malleable's core superintendent praises their excellent workability and adequate green strength without stickiness.

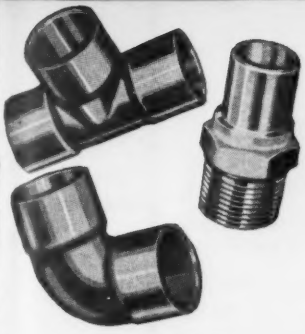
All sizes up to 2" diameter cores bake out thoroughly in a 1½ hour cycle providing exactly the right degree of strength and collapsibility.

Specific-purpose LINOILS can be supplied to your core room. Your LINOIL man will help you determine the exact formula for your foundry. Write today for complete information on 700 series LINOILS.

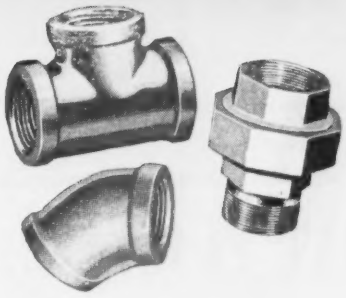


AVAILABLE TO FOUNDRIES . . . continuous Technical Information Service on the latest developments from the ADM Sand Laboratory. Furnished in handy file folder form for quick reference. A request on your letterhead will put your name on our Technical Information mailing list.





20% of the company's cores are supplied to Union's subsidiary foundry, Union Copper & Brass Company. Operator is pouring brass fittings on modern merry-go-round conveyor.



Setting cores in multiple mold prior to pouring malleable iron fittings. Strong LINOIL cores stand up well under transporting and handling.

YOU'RE ON THE RIGHT TRACK WITH THE ADM LINE OF QUALITY FOUNDRY PRODUCTS

Fremont MAGNESIUM FLASKS

The Way to

MORE EXACTING WORK

Accurately machined inside surfaces and flanges. Steel faced top and bottom flanges.

LONGER SERVICE

Magnesium has twice the tensile strength of aluminum.

EASIER HANDLING

Magnesium weighs 1/3 less than aluminum.

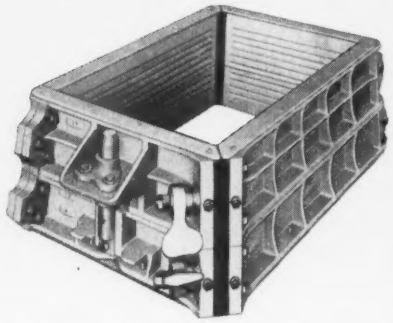
All orders given prompt attention. Write today for literature.

THE FREMONT FLASK CO.

FREMONT, OHIO

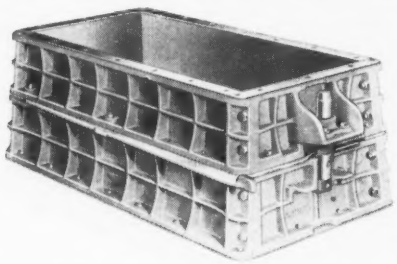
The New

FREMONT SPREADLOCK FLASK



Long-life, easily replaceable, live rubber corner inserts completely close the corner gaps so that no sand can lodge in the open corners.

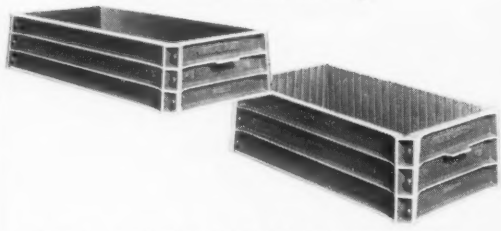
FREMONT STANDARD SLIP FLASK



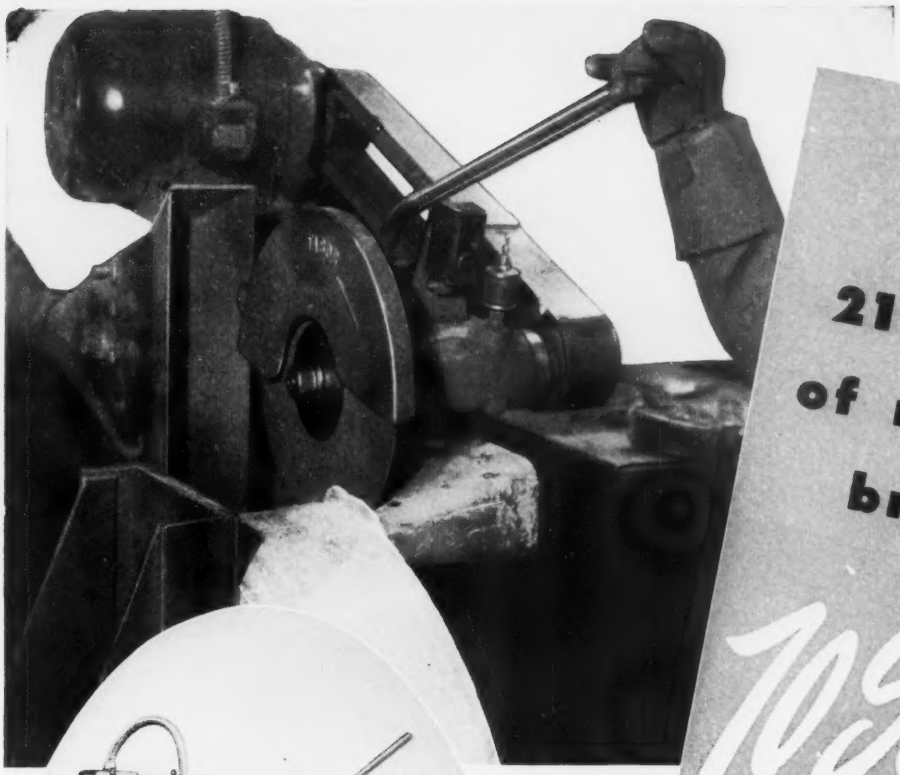
The one-inch **GROOV-LOCK FOOLPROOF PIN**, particularly adapted to cope or drag pattern jobs, guarantees perfect alignment indefinitely. (Other types of standard pin fittings available.) Solid, bolted and welded corner construction.

FREMONT CAST IRON OR CAST ALUMINUM JACKETS

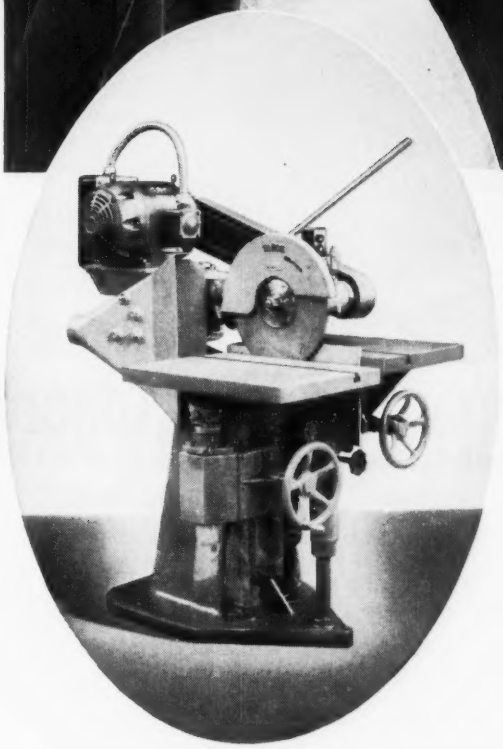
Save You Real Money!



Precision machined and drilled, bolted corner construction permits easy insertion of new sides or ends. The entire jacket need not be scrapped. Standard style for ordinary foundry practice. Grooved style, which permits ready gas escape, for steel foundries. Glass and jackets can be assembled on 3°, 4°, or 5° taper.



Through 21 sq. inches of manganese bronze in 10 Seconds!



That's a mighty fast cut for a 16" wheel driven by a 10 H.P. motor—a good example of how top-speed production schedules are "meat" for Tabor-Brasive Cut-Off Machines.

These rugged machines cut gates and risers from non-ferrous and ferrous castings in a matter of seconds. Clean, close cuts, too, that slash snagging and finish-grinding costs to the bone—often do away with them entirely.

And for the *really tough* cutting jobs—in steel foundries—in copper cutting (either gates and risers or crucible feed stock)—wherever the going's the toughest, Tabor makes a big-value 15 H.P. cut-off.

Any way you look at it, a Tabor-Brasive Cut-Off Machine—equipped with today's hard-to-break, safe-to-use wheels—is *your* answer to more cuts at less cost, with safety.
Write, wire or 'phone for more details.

SPECIFICATIONS

Motor	Table Size (Split Type)	Wheel Diam.	Max. Height of Work Under Wheel
10 H.P.	36" x 25"	16" Max. Thickness—5/32"	20" (with head over table) 46" (with head swung to side)
15 H.P. (Two Speed)	41" x 30"	20" Max. Thickness—3/16"	18" (with head over table) 44" (with head swung to side)
All motors fully enclosed, fan-cooled, ball bearing			

Factory representatives in most principal cities. Write us for details and name of our representative nearest you.

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

The TABOR Manufacturing Co.

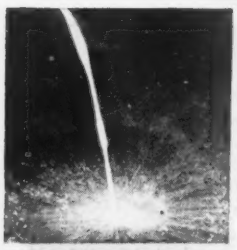
SINCE 1884 MANUFACTURERS OF FOUNDRY MOLDING MACHINES • OUR SEVENTIETH YEAR

6225 TACONY STREET • PHILADELPHIA 35, PENNA.

EXPORT DEPARTMENT, 1010 SCHAFF BLDG., PHILA. 2, PA.

THE new RIMCO squeeze BOTTOM and pattern BOARD

FIRE RESISTANT AT 2900° F



2900° F. molten iron.

Hot metal after three minutes.

Surface scarred but undamaged.

LASTS MORE THAN TEN TIMES LONGER

Warp-Free **Smooth Surface** **No Deflection**
Fire-Resistant **No Burn-outs** **Use Both Sides**
Lower Cost Per Mold **All Sizes**

RIMCO Squeeze, Bottom and Pattern Boards are surfaced on both sides with specially-processed RESINWOOD—the outstanding industrial hardboard. Designed to withstand intense heat and pressure, RESINWOOD'S superior construction is now available to the foundry in these high-density, durable Bottom Boards. Over 85 years of experience support the development of tested and proven RIMCO Bottom Boards.

FREE SAMPLE . . .

Send today for a free sample of this amazing RESINWOOD facing. Test it in your own foundry. See how the processed RESINWOOD stands up under 2900°F. molten metal. You can be sure of lower production costs with the RIMCO BOTTOM BOARD.

QUALITY Since RIMCO 1868 MILLWORK

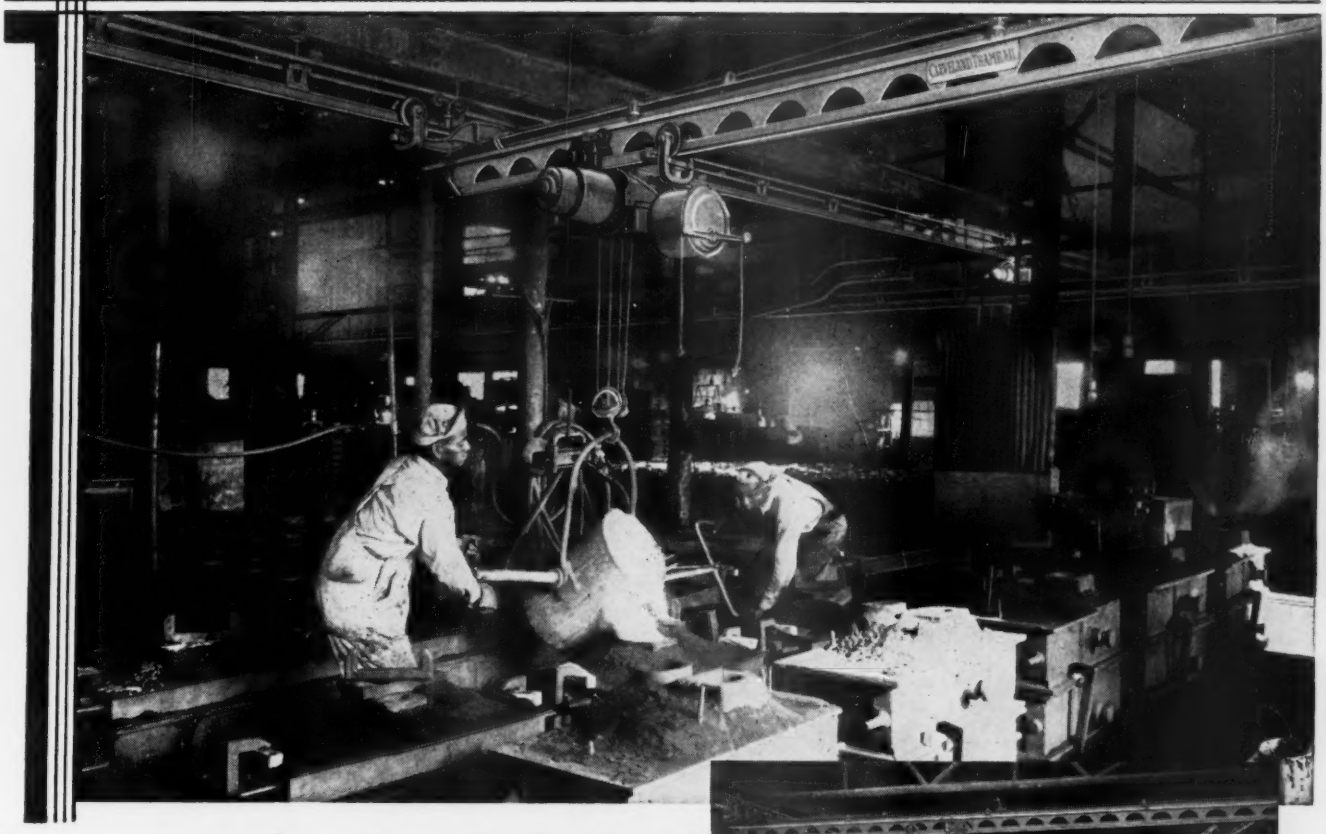
ROCK ISLAND MILLWORK COMPANY

RESINWOOD DIVISION

Rock Island Illinois

Ask any Federal Foundry Supply Co. representative. Cleveland—Crown Hill, W. Va.—Chicago—Detroit—Milwaukee—Richmond, Va.—St. Louis—Chattanooga—New York—Upton, Wyo.

from LIGHT *to* HEAVY *Production Overnight*



Texas Foundry Revolutionized with CLEVELAND TRAMRAIL

Before the advent of Cleveland Tramrail the Trinity Valley Iron and Steel Company, a gray iron jobbing foundry in Ft. Worth, Texas, was limited to the production of small castings because their flasks, molds, cores and ladles could be no larger or heavier than readily handled by hand, except in the main bay of the shop.

Practically overnight this concern was revolutionized by installation of a Cleveland Tramrail system. It took them out of the small casting class; they now can pour castings of any size, from the smallest to the largest. It cut drastically the time required for handling materials and thereby boosted efficiency greatly. It reduced metal heat loss because conveying time from cupola to mold is less via the Tramrail route. Safety has been aided.

The Cleveland Tramrail system at Trinity Foundry consists of many bridges, hoist carriers, switches and extensive trackage which provides overhead handling service for nearly the entire floor area.

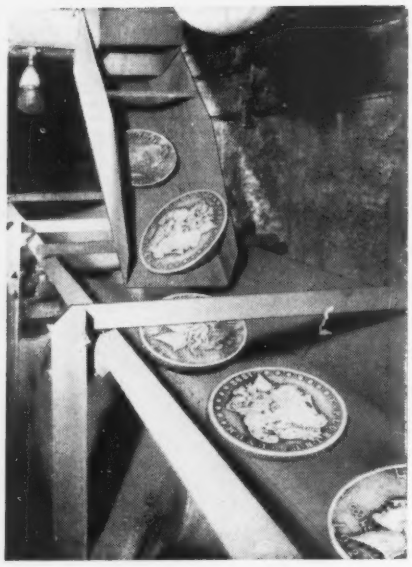
Trinity is now in such a favorable position that it is serving customers over a wide radius, some more than 1000 miles distant. It is doing so expeditiously, with better castings at lower cost.

GET THIS BOOK!

BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
3816 EAST 286TH ST. *WICKLIFFE, OHIO*

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT



Your money goes farther on an Imperial Belt

Saved $30,000 in one year
A big farm implement manufacturer reduced conveying costs more than $30,000 in one year with Imperial Super-Insulated Sahara Belting to handle white hot castings.

Cut belting costs 50%
An Imperial Insulated Sahara Belt carrying hot core sand lasted twice as long as the best of four other belts tried in an Eastern foundry.

$900 savings in 8 months
Red hot scrap and 200°F. sand burned up two rubber belts in 8 months in a Detroit foundry. An Imperial Belt lasted 8 months, 8 days, saved $900 in belting costs and ended costly shutdowns for repairs.

In Imperial's thick case-history file is convincing evidence that your belting money will go farther on Imperial's superior construction: tough silver duck, asbestos insulated, saturated with Imperial's exclusive compounds to resist damage by heat, abrasion and impact.

Write for full information today

Imperial
BELTING CO.
1755 S. Kilbourn Ave.
Chicago 23, Ill.

You expect more from Imperial . . . and you get more

WITH THE EDITORS

PROGRESS IN ONTARIO: The annual meeting of the Malleable Founders Society at the Seiginory Club, Montebello, Que., offered an excellent opportunity to see some of the interesting parts of Canada. We drove east from Cleveland and spent the night at the Thomas Motel, a fine operation on the western approach to Oswego, N. Y. The following morning we continued east to U. S. 11, then to Watertown, N. Y., and on to Alexandria Bay and the international bridge at the Thousand Islands. Crossing this fine bridge, with its splendid view of the St. Lawrence and the islands, was quite a thrill. We then continued on King's Highway 2 to Johnstown and Route 16 to Ottawa.

This route enters Ottawa through the wonderful park system that follows the Rideau Canal to the center of the city, a most enjoyable drive. We crossed the Ottawa River to Hull, and then drove east about 45 miles to the club. It might be recorded that many of the citizens of this section of Quebec enjoy the Sunday afternoon drive but they move at about 20 miles per hour, a most difficult speed for those who are intent on reaching a particular destination.

The Seigniory Club is beautiful, and quite unusual. The atmosphere is friendly and the hospitality is generous.

On Tuesday afternoon of that week, I drove 80 miles to Montreal to attend the Publishers Party, held in conjunction with the annual meeting of the National Industrial Advertisers Association. The trip back to Montebello, with the full moon shining on the Ottawa River, was impressive.

We left the club, drove east and crossed the river into Ontario at Hawkesbury, and took route 34 to the St. Lawrence and Route 2. The drive west along the river will long be remembered. We were particularly impressed with the rather heavy traffic on the river, and we enjoyed tremendously seeing ships being passed through the locks, especially near Cornwall. We could not help but picture the scene some years hence when the St. Lawrence waterway has been completed and the ocean-going ships from many countries are using this avenue of commerce.

We spent the night at Gananoque, an old town just east of Kingston. We had dinner at the Golden Apple Inn, a lovely spot in that town. Ran into the William Osbornes from Racine, Wis., and the Frank Parkers from Dayton, O. at this establishment.

The next day we followed Route 2 west through the industrial section of the province, through Toronto and on to Woodstock. The following day we visited at London and then crossed the International Bridge from Sarnia, Ont., to Port Huron, Mich.

This trip across the entire southern section of the province of Ontario permitted us to see the industrial progress of that section of Canada. In cities and towns we saw many fine new factories and new plants under construction. The huge oil refineries at Sarnia, which were built recently to handle oil from the new Canadian fields, were impressive.

We came back home with a feeling of admiration for our neighbor across the lakes and rivers whose industries are moving ahead so rapidly.

—o—

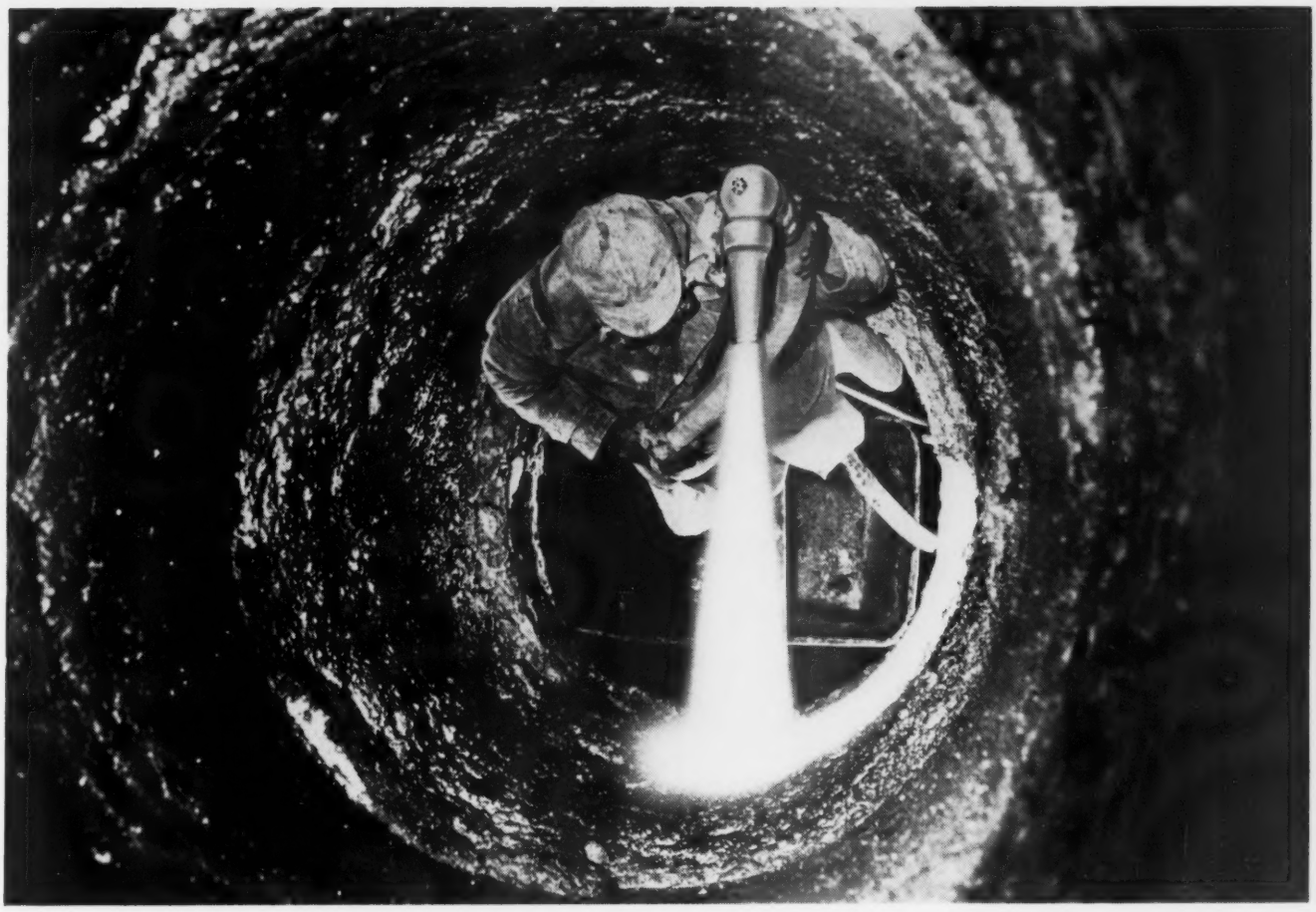
A Real Cost Manual: If you operate a nonferrous foundry, you should be greatly interested in a new publication of the Non-Ferrous Founders' Society, 192 N. Clark St., Chicago 1. This is a "Manual of Basic Cost Principles for Nonferrous Foundries", and is the work of the society's cost committee. I believe it is one of the best jobs of its kind yet produced since it provides a simplified cost system for the small shop and an expanded system for the larger establishments. Cost records are shown and simplified methods for arriving at departmental costs are included. Therefore, congratulations to the society and the hard working committee. The price is $5.

—o—

An Invitation: A letter from Nick S. Covacevich, Cia. Proveedora de Industrias, Mexico City, Mexico, chairman and one of the sparkplugs of the Mexico City Chapter of AFS, extends a cordial invitation for any foundrymen visiting Mexico City to also visit the chapter, which generally meets the first Wednesday of every month. The secretary or the chairman can be reached by phone at 11-50-40, or at Marsella 78.

Nick also suggests that the chapter would appreciate greatly the loan of any 16-mm films on foundry subjects. Meetings at which foundry films are shown attract a larger

(*Concluded on page* 12)



Gunning for savings with HARBISON-WALKER

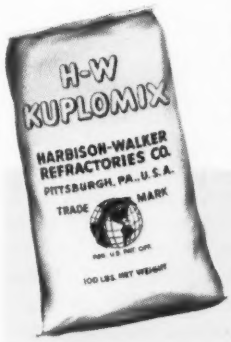
KUPLOMIX

Substantial savings in cupola maintenance are assured by the use of H-W KUPLOMIX—a modern refractory which provides joint free linings. In the foundry it is also used to good advantage for the linings of ladles and troughs.

H-W KUPLOMIX is easy to apply either by air-placement guns or by ramming. It is exceedingly resistant to the impact and abrasion of the charge, the erosive action of molten metal and slags and to the chemical attack of slags.

H-W KUPLOMIX consists of grain-sized silica quartzite of unusual purity and a highly refractory bond clay which develops a strong ceramic set at furnace temperatures.

Please write for complete information about H-W KUPLOMIX, the modern service-proved cupola refractory.



Harbison-Walker Refractories Company

AND SUBSIDIARIES

World's Largest Producer of Refractories

GENERAL OFFICES **PITTSBURGH 22, PA.**

A Modern Installation of Mathews Foundry Conveyers

however it must be handled

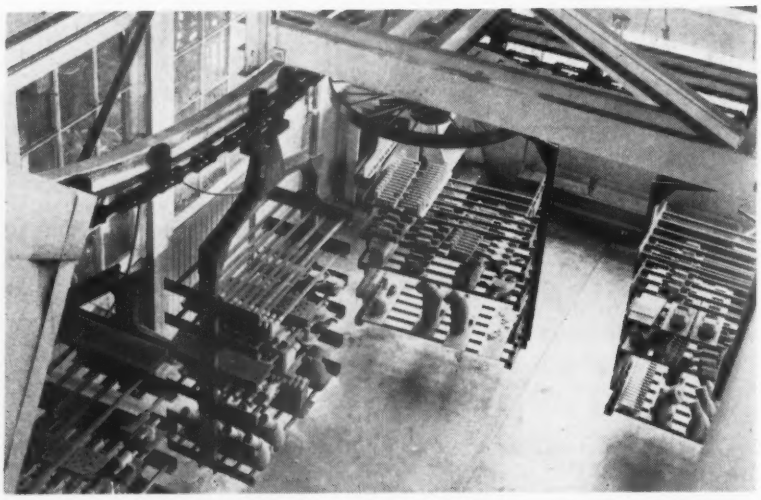
by GRAVITY

In foundries everywhere, Mathews Roller Conveyers are standard equipment. They are designed by people who know foundry conveying problems. *They are built to stay on the job.*

or POWER

Trolley, live roller, pallet and drag chain—they are all part of the complete Mathews line of power conveyers engineered for *foundry* service.

. . . there are MATHEWS CONVEYERS to do the job the way it should be done



Cores are handled smoothly, safely, on Mathews Trolley Conveyers

MATHEWS CONVEYERS

GENERAL OFFICES . . . *Mathews Conveyer Company*
ELLWOOD CITY, PENNSYLVANIA

PACIFIC COAST DIVISION . *Mathews Conveyer Company West Coast*
SAN CARLOS, CALIFORNIA

CANADIAN DIVISION . . . *Mathews Conveyer Company, Ltd.*
PORT HOPE, ONTARIO

Engineering Offices or Sales Agencies in Principal American and Canadian Cities

(*Concluded from page* 10)

attendance. Write to Nick at Apartado 1030, Mexico D.F., if you can loan the chapter a film.

—o—

A Rich Harvest: Just in case you may discount my frequent references to the tremendous progress in the foundry industry, let me quote from another editor. George F. Trundle Jr., chairman, Trundle Engineering Co., writing in an interesting booklet, 'Trundle Talks," has high praise for the recent foundry show as follows:

"I have been a close student of industrial equipment for years—but I don't know when any trade show has impressed me as much as did the Foundry Show. The advances in the art of making castings, which were there displayed, were literally startling.

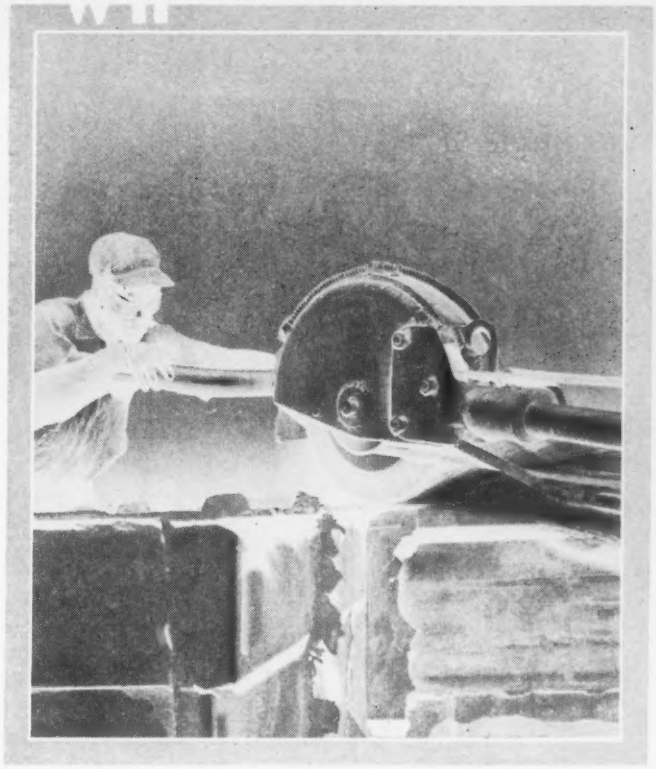
"Two new processes in particular were very effectively presented—the shell molding process and the pressure molding process. Without going into technical details, it is sufficient to say that these processes were so attractively demonstrated that the customers' buying instincts were aroused far beyond mere dollar and cents considerations. They made such an appeal to the imagination that the customer will want them for their own sake—just as the housewife wants a better vacuum cleaner, or a baseball fan wants a better television set. It is the display of something which activates human desires that pries money out of idleness and puts it to work on behalf of production, employment, prosperity and profits.

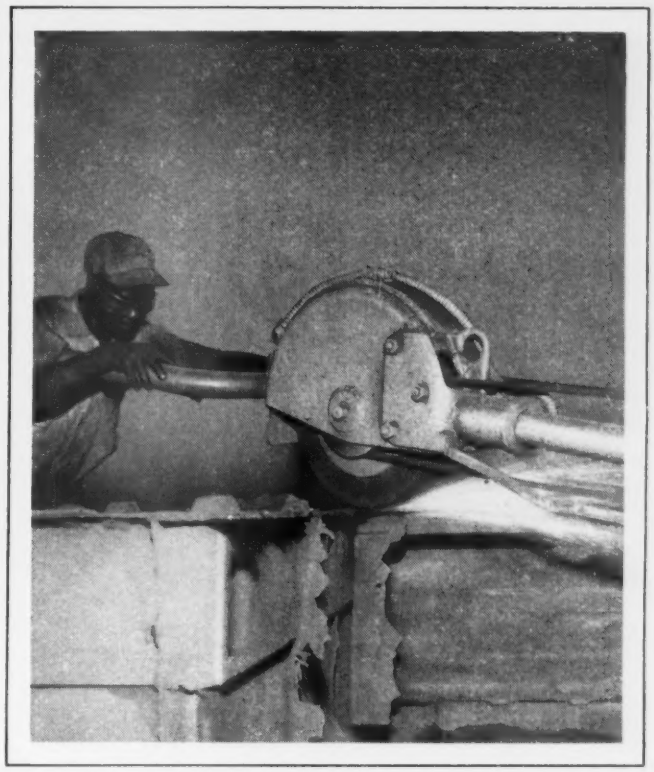
"The Foundry Show demonstrated every conceivable new development in the making of castings. It brought these new developments out front and explained them. It performed an aggressive sales job. That's the type of job that I think every company must undertake today. And if it does—and if it has the right kind of improved product—I believe it will reap a rich harvest."

—o—

Features in the Fall: Dog days are here. Some sections of the country are having floods while others have the usual summer drought. It is hot and humid and thoughts go to vacations every now and then. Nevertheless, the editors are hard at it, preparing this issue and planning for the fall. Several features to be announced later will provide you with material of considerable interest. So, as the announcer says—"Stay with us for the programs coming up."

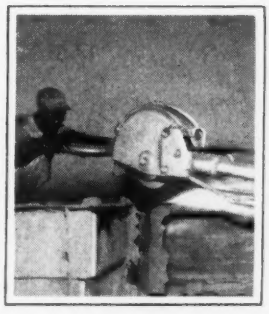
F.G.S.





REDUCE SNAGGING COSTS

with Cincinnati PD Grinding Wheels



Through the CINCINNATI (PD) Manufacturing Process, you can be *positive* that *every* CINCINNATI (PD) Wheel you order for stand, swing frame or portable grinders will be produced repeatedly to the exact CINCINNATI grading specified for your job.

Just as a negative guarantees exact duplication of a photograph, the CINCINNATI (PD) *Manufacturing Process assures a* POSITIVE DUPLICATION *of the original wheel EVERY time you reorder. Yet* these better, cost-cutting CINCINNATI (PD) Wheels *are priced no higher than ordinary wheels.*

Positive Duplication (PD) is the result of extensive manufacturing research and the development of new standards of manufacture with 36 quality control steps. "On grade" with a CINCINNATI (PD) Wheel means all future (PD) Wheels will act and grind exactly alike —providing the *same fast cutting* of the original wheel, the *same long wheel life,* the *same reduced operator fatigue* and the *same self-dressing action.*

CINCINNATI (PD) Wheels are made in vitrified and resinoid bonds for ferrous and non-ferrous foundries and weld shops. They are available in a complete variety of popular sizes and shapes. We'll be happy to tell you about our complete line of straight wheels, cups, cones and plugs, and to prove to you how CINCINNATI (PD) Wheels will make money for you. Just contact us and we'll send one of our representatives. Wire, write or 'phone Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

CINCINNATI
Grinding Wheels
THE CINCINNATI MILLING MACHINE CO.
Cincinnati 9, Ohio

(Advertisement)

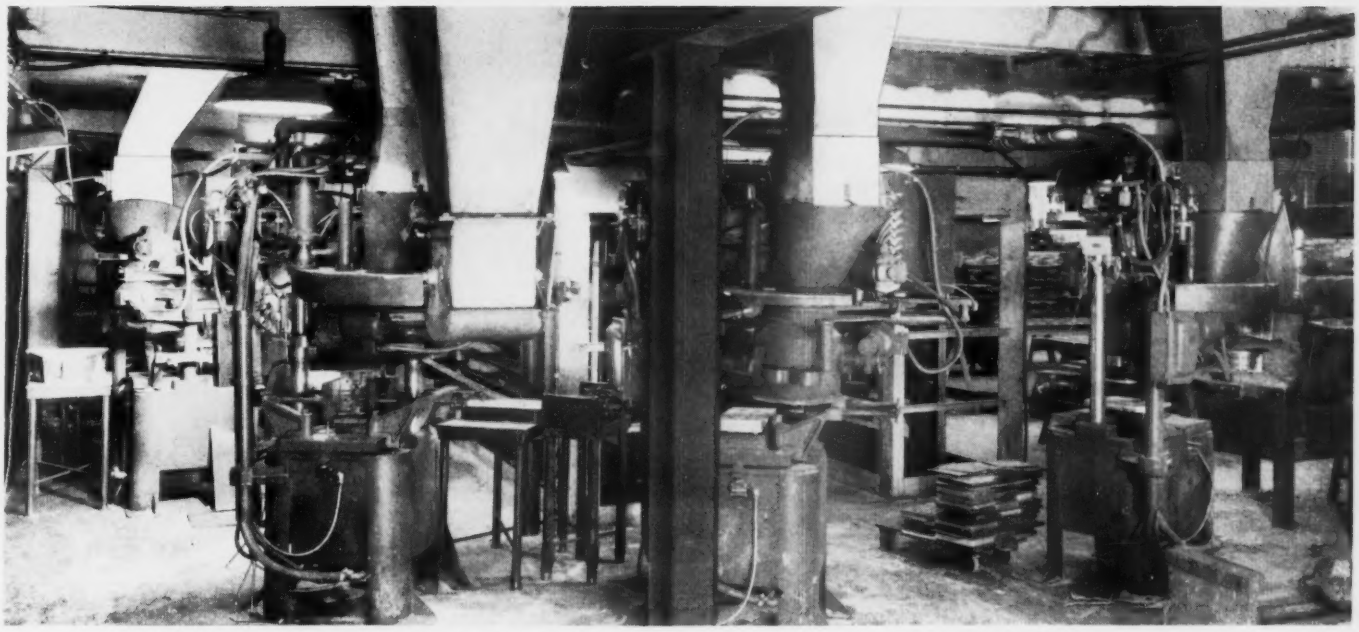
Typical cores produced on San-Blo machines and baked in tower oven shown at rear of photo.

Malleable Foundry

GOES ALL OUT FOR SAN-BLO CORE BLOWERS

A PROMINENT midwestern production foundry recently completed the revamping of their core room. For core blowing equipment, they standardized on Model 40-D-9 fully-automatic San-Blo core blowers and now have 14 of these machines in operation. Principal reasons for this choice, arrived at by testing the various makes of core blowers were (1) San-Blo ability to blow their many sand mixtures, (2) its versatility in handling a wide range of core sizes, (3) quick changing of blow plate, (4) automatic controls and (5) greater blowing efficiency and speed of operation.

The San-Blo's exclusive "Cyclo-Air" action enables this foundry to blow all their core sand mixtures, which normally are heavy and difficult to blow. Motor-driven plows in the blow head agitate the sand continuously during the blowing cycle, to keep the blow plate covered with sand at all times. Blow head design provides an aerating air circuit that conditions and carries the sand through the blow holes, into the core box. This "Cyclo-Air" action makes it possible to blow sand mixtures that previously had to be hand-rammed. It also eliminates "piping" in the blow head, so that better than 80% of the sand load is delivered into the core box—making it possible to blow a number of core boxes without refilling the sand magazine.



San-Blo machines shown above are installed around the tower oven shown at left and serviced with overhead sand supply

San-Blo versatility is also important to this foundry. Cores weighing from a few ounces to 40 lbs. each may be blown on each machine with the same blow head. Blow plates may be changed easily and quickly by simply lifting out a clevis pin and spreading two half-rings that lock the blow plate to the blow head.

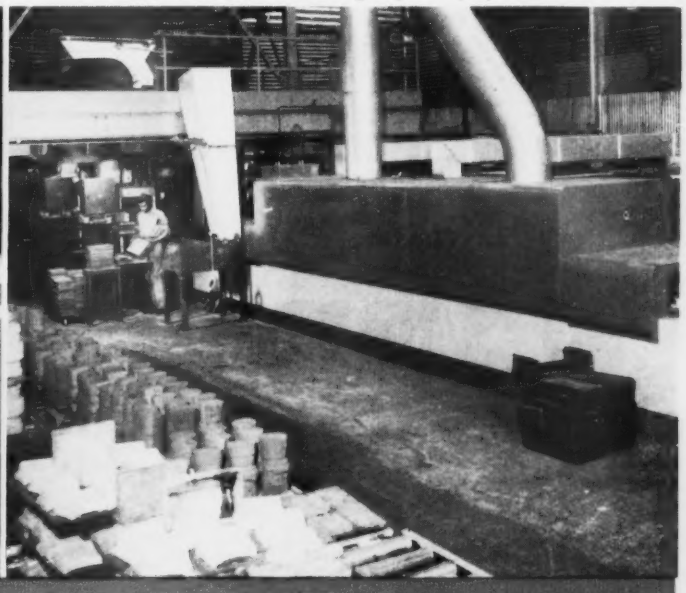
The 40-D-9 machines are fully-automatic with the sequential cycle being initiated by a single push button. Each operation of the automatic cycle is adjustable to suit job requirements: (a) timed blow, (b) timed refill of the blow head sand chamber after each blow or after a predetermined number of blows.

Other automatic features include interlock controls to insure safe operation, automatic lubrication, and hydraulic draw with automatic, adjustable change from slow to fast, during the drawing operation.

In summary, the San-Blo's versatility in handling all types of sand mixes and wide range of core sizes, plus its fast, automatic, safe operation and efficiency in producing high quality cores, clearly indicated that it was the ideal machine for this foundry's core blowing requirements.

These San-Blo machines blow cores for quick drying in dielectric dryer shown at right.

Over-all view of San-Blo and dielectric dryer unit. Three San-Blo's keep this oven going at top speed.



FEDERAL

The **FEDERAL FOUNDRY SUPPLY** *Company*

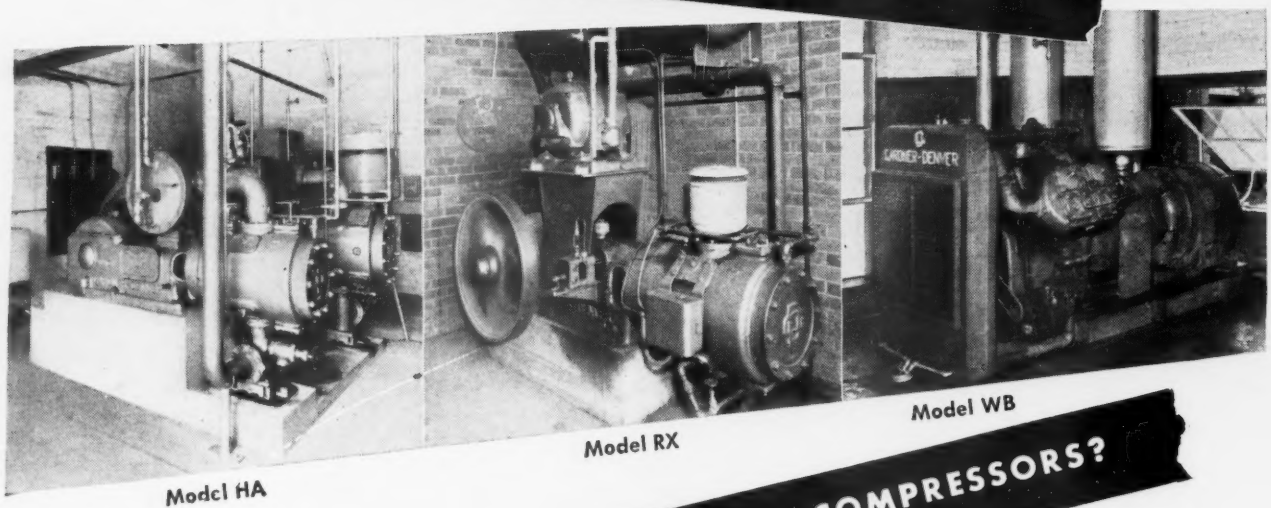
4600 EAST 71st STREET, CLEVELAND 5, OHIO

CHATTANOOGA · CHICAGO · DETROIT · LOS ANGELES · MILWAUKEE · NEW YORK

EUROPEAN REPRESENTATIVE: SA. PH. BONVILLAIN & E. RONCERAY Rue Paul-Carle a Chaisy-Le-Roi, Seine, France

FEMA

NEED A CENTRAL COMPRESSED AIR SYSTEM?

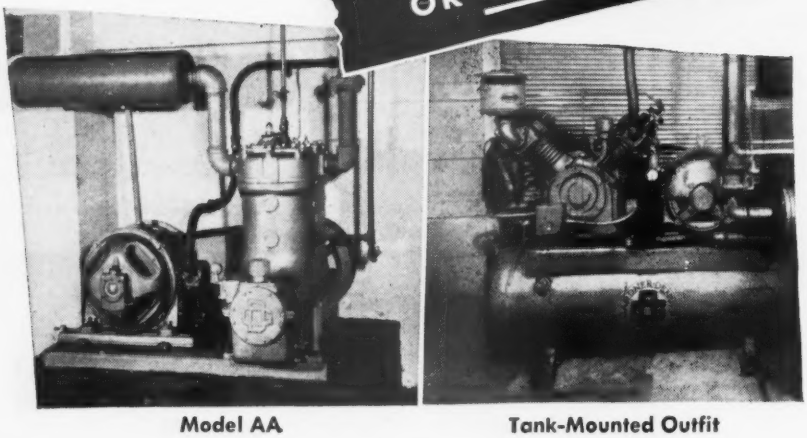


Model HA

Model RX

Model WB

OR DEPARTMENTAL COMPRESSORS?



Model AA

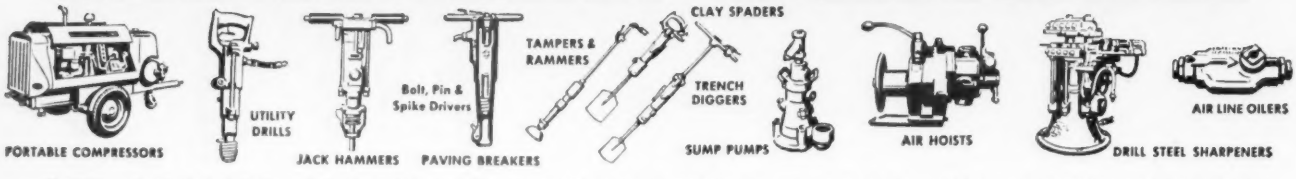
Tank-Mounted Outfit

call on GARDNER-DENVER

for expert advice in planning your compressed air system — and for quality compressors to meet your capacity and pressure requirements. Write today!

SINCE 1859

GARDNER-DENVER



THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada) Ltd. 14 Curity Avenue, Toronto 16, Ontario

Pouring Alloyco valves at Bloomfield, N. J. foundry of Alloy Steel Products Company

new!

THOR MCF-7 Shell Mold Resin

This new "neat" resin (100% resin content—no filler) improves your shell-mold process 6 ways:

1. Tolerates wide time and temperature ranges. Does not over-cure easily. Eliminates critical time and temperature control.
2. Provides full-thickness build-up . . . even on angular and vertical pattern surfaces.
3. No "peel-back" during investment.
4. No "drop-off" during investment.
5. Strips clean and easy off the pattern. Leaves no "crumbs".
6. Produces a flat, rigid shell off the pattern. No warping.

MCF-7 has been field-tested on all types of mechanized equipment and on all types of metals. It's in use now on production castings. It's ready for trial runs on *your* shell molds. When can we demonstrate it for you? Address: The Borden Company, Chemical Division, Dept. F-84, 350 Madison Avenue, New York 17, N. Y.

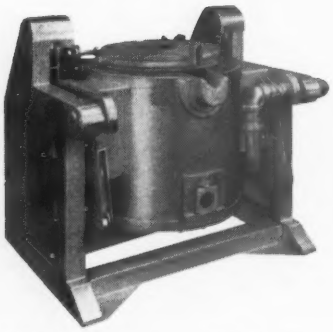
PS: For hot-bonding of shells, try THOR MCF-3378-4 shell-bonding resin.

FOUNDRY RESINS

THE Borden COMPANY

CHEMICAL DIVISION

Urea and Phenolic Resin Core Binders . . . Shell-Mold Resins . . . Core Spray . . . Core Paste . . . Parting Agents



Lindberg-Fisher type MNP nose-pour tilting crucible furnace. Pouring lip is located in the axis of tilting providing a constant pouring arc regardless of degree of furnace tilt. Capacities up to #800 crucible with brass, up to #1000 crucible with aluminum. Oil or gas fired. Described in Bulletin 57-A.

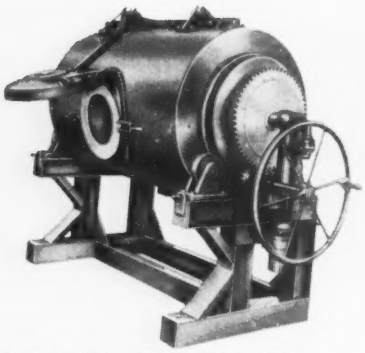
Lindberg-Fisher Electric Resistance Melting and Holding Furnace equipped with heavy duty resistance elements which give uniform distribution of heat, insuring long element and pot life. Capacities 250 to #1000 crucible.

For Non-Ferrous Metals

A complete line of

LINDBERG FISHER

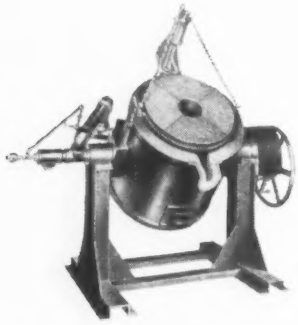
MELTING AND HOLDING FURNACES



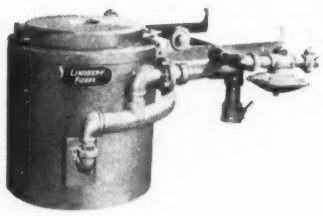
Lindberg-Fisher Simplex Rotary Open-Flame Furnace. Capacities to 2400 lbs. aluminum. 6000 lbs. brass. Oil or gas fired. Described in Bulletin 29-A.

For Melting Aluminum • brass • yellow brass bronze • copper • copper nickel alloys • lead magnesium • nickel • tin • zinc.

Because Lindberg-Fisher builds *all* kinds of melting equipment . . . gas . . . oil . . . electric . . . induction, and Carbon arc . . . L-F engineers are able to recommend, without prejudice, the proper type of furnace for *your* particular melting requirements.



Lindberg-Fisher type BB1 Hand-Tilt Crucible Furnace. Tilting mechanism consists of a hand wheel, driven through machined worm gear and pinion reducing gears. Capacities 50 to #400 crucible. Oil or gas fired. Described in Bulletin 400.



Lindberg-Fisher type SF stationary crucible furnace features rapid melting and is recommended for general foundry casting work. Capacities 30 to #400 crucible. Oil or gas fired. Described in Bulletin 301.

Melting specialists for 25 years

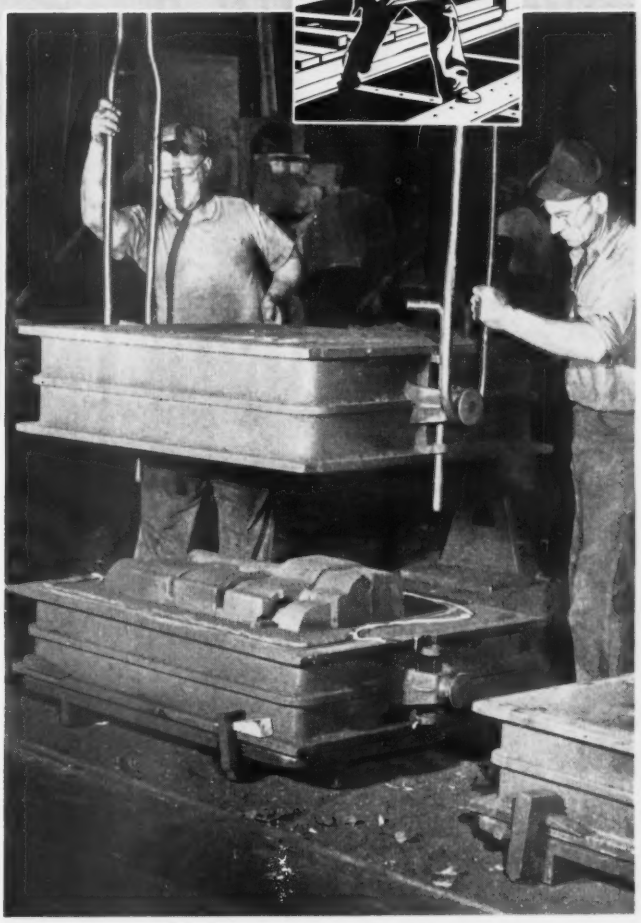
Sales and service offices in principal cities

LINDBERG FISHER MELTING FURNACES

A Division of Lindberg Engineering Company, 2453 West Hubbard Street • Chicago 12 • Illinois

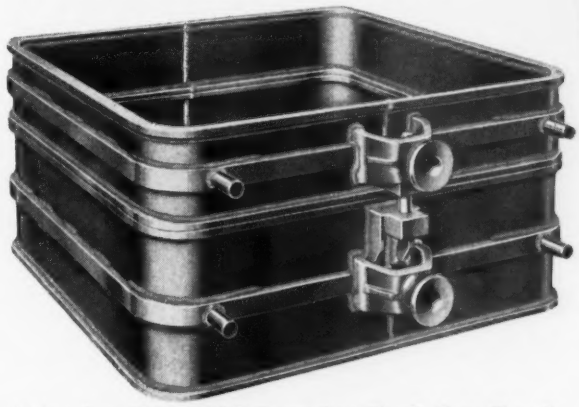
You'd send a man to do a man's job
So, specify

BS&B
Heavy Duty
FOUNDRY FLASKS
for heavy, tough service



The only heavy duty foundry flask combining all these advantages is manufactured by BS&B

1. Welding of bearing strips continuously, both inside and out.
2. Cast steel trunnions.
3. Cast steel pinlugs and clamplugs.



Write for FREE BS&B Foundry Flask Handbook

A handy catalog and useful foundryman's "Bible"... includes valuable information on foundry flasks and easy-to-order system.

Foundry Flask Division, Dept. 7-AR8

A boy can't do the job of a man any more than a lightweight flask can do a foundry job calling for a heavier one. And there's a difference in heavy duty flasks, too! You may even find BS&B Foundry Flasks initial cost a little more; but their actual cost is low . . . low maintenance will soon make up the difference . . . you'll get years of economical service from these time-proven work horses. BS&B methods of corner forming of walls and bearings separately, plus welding bearings to walls, both inside and out, eliminates corner stresses, preventing the corners from cracking and breaking out. Production and maintenance records maintained by many foundries prove that BS&B Foundry Flasks pay for themselves many times over in the money and time they save on minimum maintenance.

FOUNDRY
OUR 60TH YEAR
BS&B
FLASKS

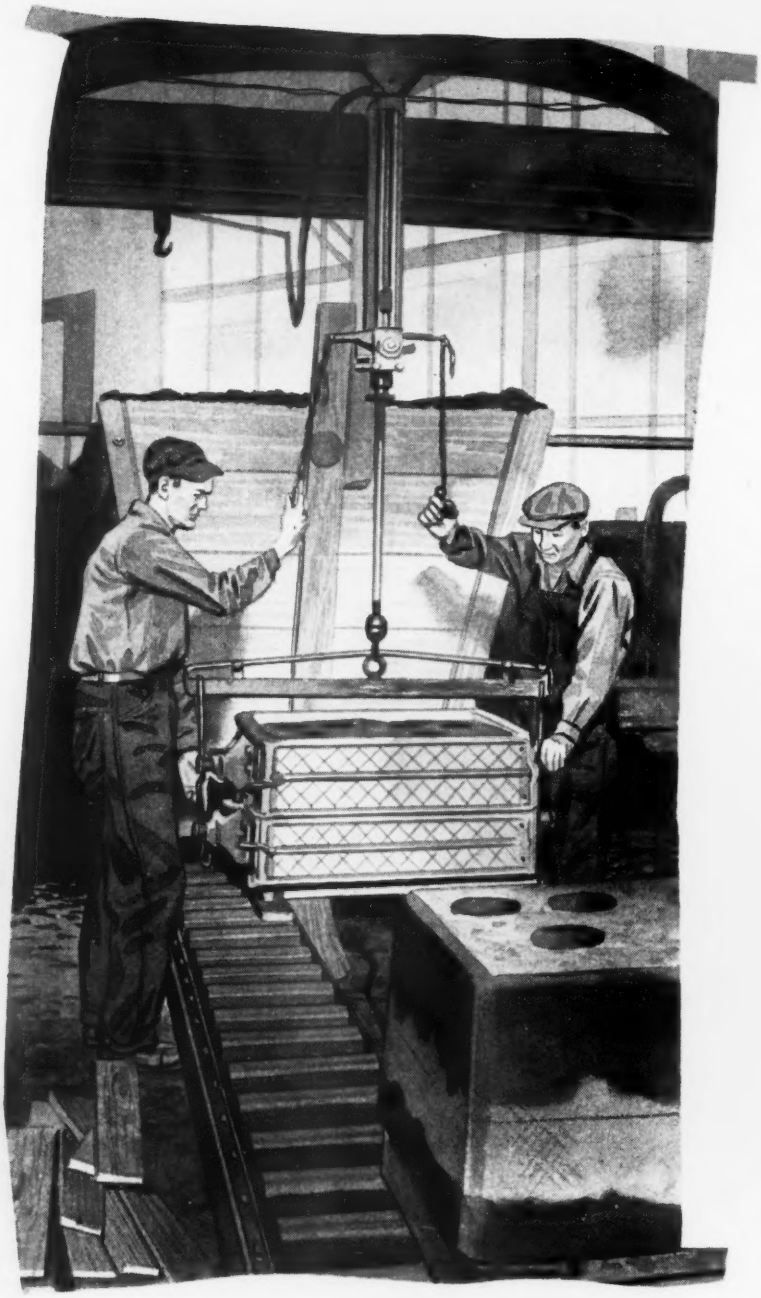
BLACK, SIVALLS & BRYSON, INC.

7500 East 12th Street — Kansas City 26, Missouri

..be sure with a

NATIONAL BENTONITE

bond!



A dependable National Bentonite bonded mold means better production, better castings, less time in the cleaning room. Many experienced foundrymen have relied on National Bentonite for years because of consistently uniform high quality . . . good green strength . . . high hot strength . . . high sintering point . . . good mold durability . . . and because it requires the least water to temper correctly. You, too, can be sure of better bonds with NATIONAL BENTONITE. Quick service from better foundry suppliers everywhere.

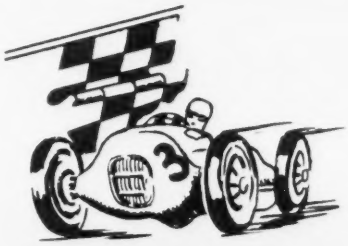
Baroid

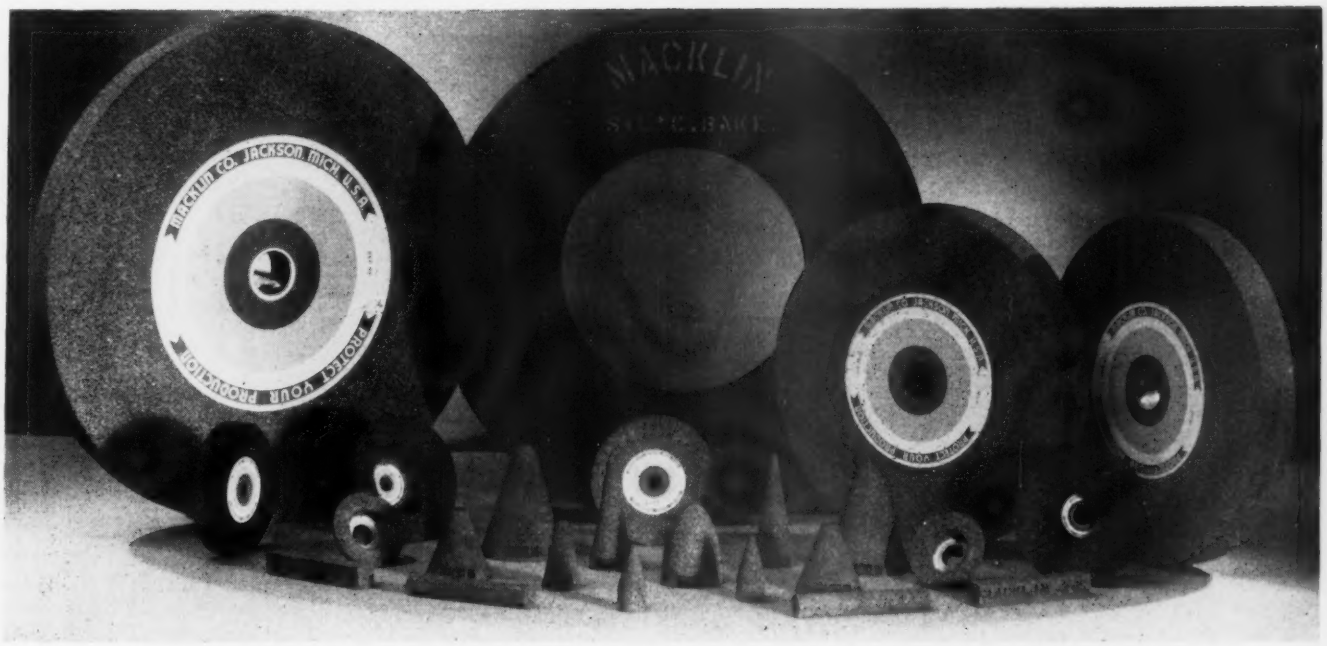
Baroid Sales Division ☆ National Lead Company

Bentonite Sales Office: Railway Exchange Building, Chicago 4, Illinois

4721

MACKLIN Will make you a winner in your production race





■A winner because Macklin Grinding Wheels are expertly manufactured to speed and "protect your production." Made in all sizes and shapes, in all grain and grade combinations, there is a Macklin Grinding Wheel to fit any foundry job.

■Call your nearest Macklin distributor or the services of a trained Macklin field engineer and be among the Macklin production winners.

MACKLIN GRINDING WHEELS

MACKLIN COMPANY

Manufacturers of GRINDING WHEELS and OTHER ABRASIVE PRODUCTS

JACKSON, MICHIGAN

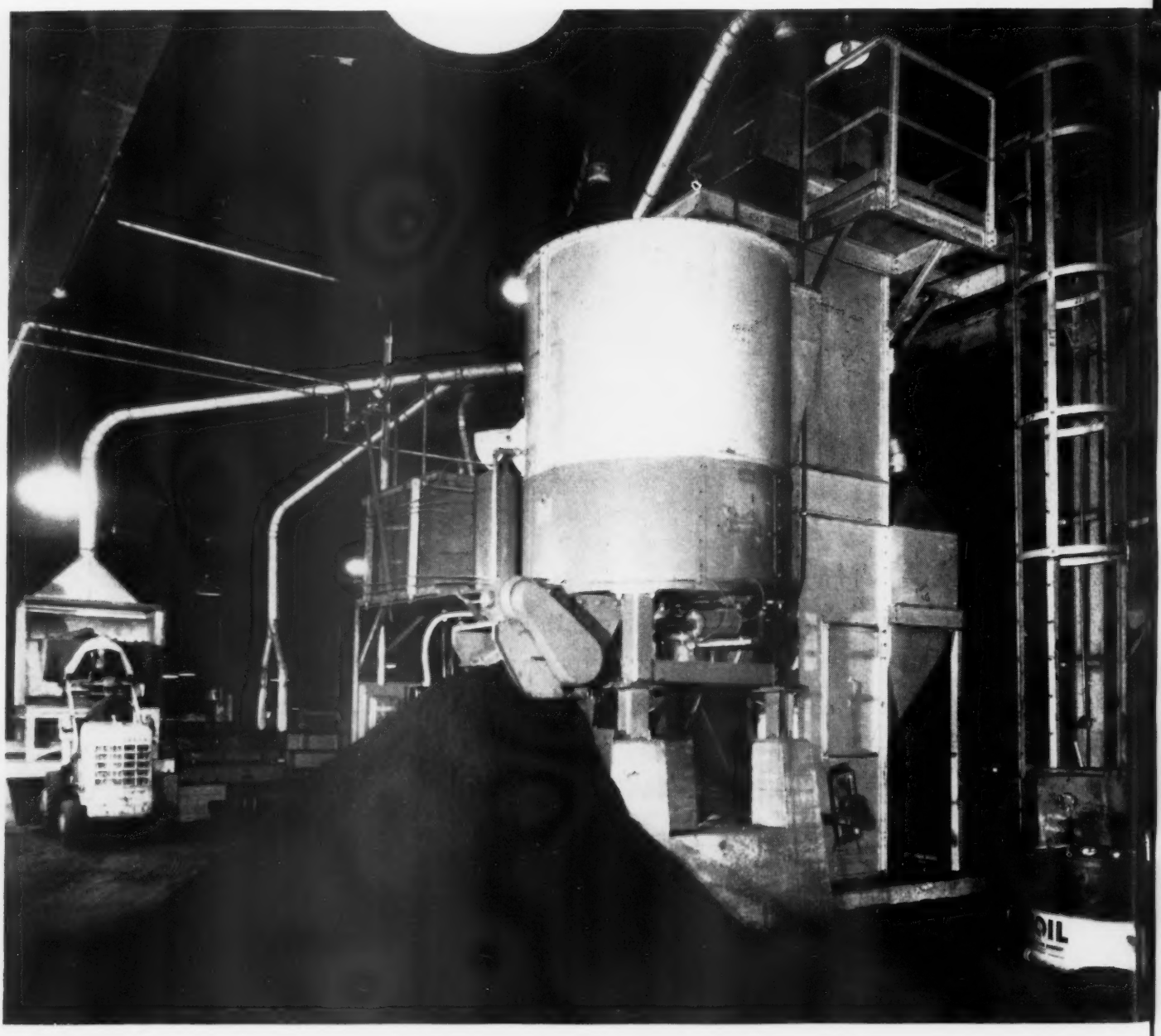
Sales Offices:

BIRMINGHAM
BUFFALO
CHICAGO
CINCINNATI
CLEVELAND
COLUMBUS
DETROIT
FLINT
HOUSTON
INDIANAPOLIS
LOS ANGELES
MILWAUKEE
MOLINE
NEW YORK
PHILADELPHIA
PITTSBURGH
ST. LOUIS
SAN FRANCISCO

NATIONAL *UTILITY UNIT*

saves over $15,000 in first year's operation

. . . HELPS INTERSTATE FOUNDRY CO. IMPROVE WORKING CONDITIONS AND ESTABLISH WAGE INCENTIVE PLAN



● Typical *Utility* Unit table-level shakeout-spruing station operated by Interstate Foundry Company. Sand is returned to 2F MIX-MULLER on belt at left. Castings and used sand are collected and charged to double deck screen through hopper by truck at rear.

THIS month, as they have for over 15 months, Interstate Foundry Company, Indianapolis, Indiana, jobbing foundry, is saving about $1,300 by preparing their sand faster, more efficiently and with fewer men. The reason? The company processes up to 200 tons of sand in 8 hours with the National *Utility* Sand Preparing Unit shown at left. Six men now do the work of 12. Each earns from 18 to 20% more for from five to twelve fewer working hours each week.

In twelve months of operation, savings in *manpower* alone have amounted to $15,000 . . . much of the costly manual handling of molds, sand and castings has been eliminated. Maintenance of sand preparing equipment has been rendered negligible. The rugged new 2F Simpson MIX-MULLER properly prepares more sand in 6 hours than was previously made up in 10 to 12 hours. With even, controlled distribution of bond and moisture content, the quality and workability of the sand has improved by 50%.

To employees—Interstate has been able to pass on these savings in the form of a unique wage incentive plan — permitting *fewer* men to make *more* money during fewer working hours. To Interstate jobbing customers—these improvements mean quicker delivery, excellent castings at reasonable prices.

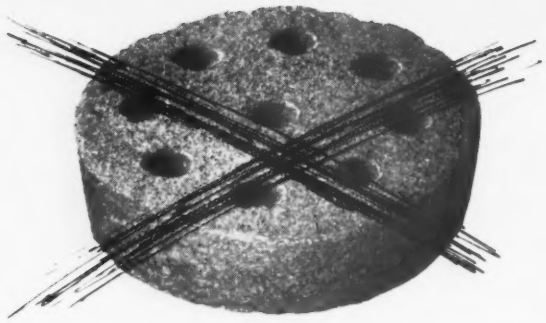
To YOU these savings are cited as typical of the dollars and cents return that can be realized in liberating sand from costly and inefficient floor heaps with the National *Utility* Unit. A National engineer can show you, through example and from your own records, how the cost of a National *Utility* Unit can be amortized in from 2 to 3 years.

Write today for bulletin #508.

National Engineering Company
(Not Inc.)
646 Machinery Hall Bldg. • Chicago 6, Illinois

NATIONAL SAND and MOLD HANDLING EQUIPMENT
NATIONAL SAND RECOVERY SYSTEM

SIMPSON
Intensive
MIX-MULLERS



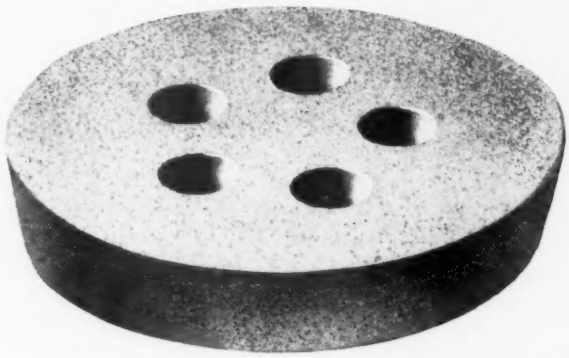
SHOP-MADE SAND CORES ARE OBSOLETE!

A few years back, foundries *had* to use shop-made sand cores. That's all they had. Costly rejects losses, dirty metal, and extra machining time were an inevitable part of the cost of producing castings.

Today that's not true. As foundry after foundry has discovered, you can slash rejects losses to a minimum, reduce machining time, and produce better castings, *often at less cost per core*, with AlSiMag Ceramic Strainer Cores.

The reason is simple—AlSiMag Ceramic Strainer Cores are made of a material specifically developed after years of research for the greatest possible resistance to heat shock. As a result of our extensive high-speed production facilities, they can be produced at less cost than most shop-made sand cores!

USE AlSiMag® Ceramic STRAINER CORES



- Resistant to heat shock
- No erosion at normal pouring temperatures
- Non-spalling
- Completely free of gas
- Not affected by moisture
- Strong, will stand the roughest handling
- Do not contaminate scrap
- Flat and uniform

TEST THEM IN YOUR OWN FOUNDRY

Try AlSiMag Ceramic Strainer Cores —let your own experience tell the story. Test samples of standard sizes free on request. Samples made to your specifications at reasonable cost.

WRITE TODAY

WRITE DEPT.-D

AMERICAN LAVA CORPORATION

A SUBSIDIARY OF MINNESOTA MINING AND MANUFACTURING COMPANY

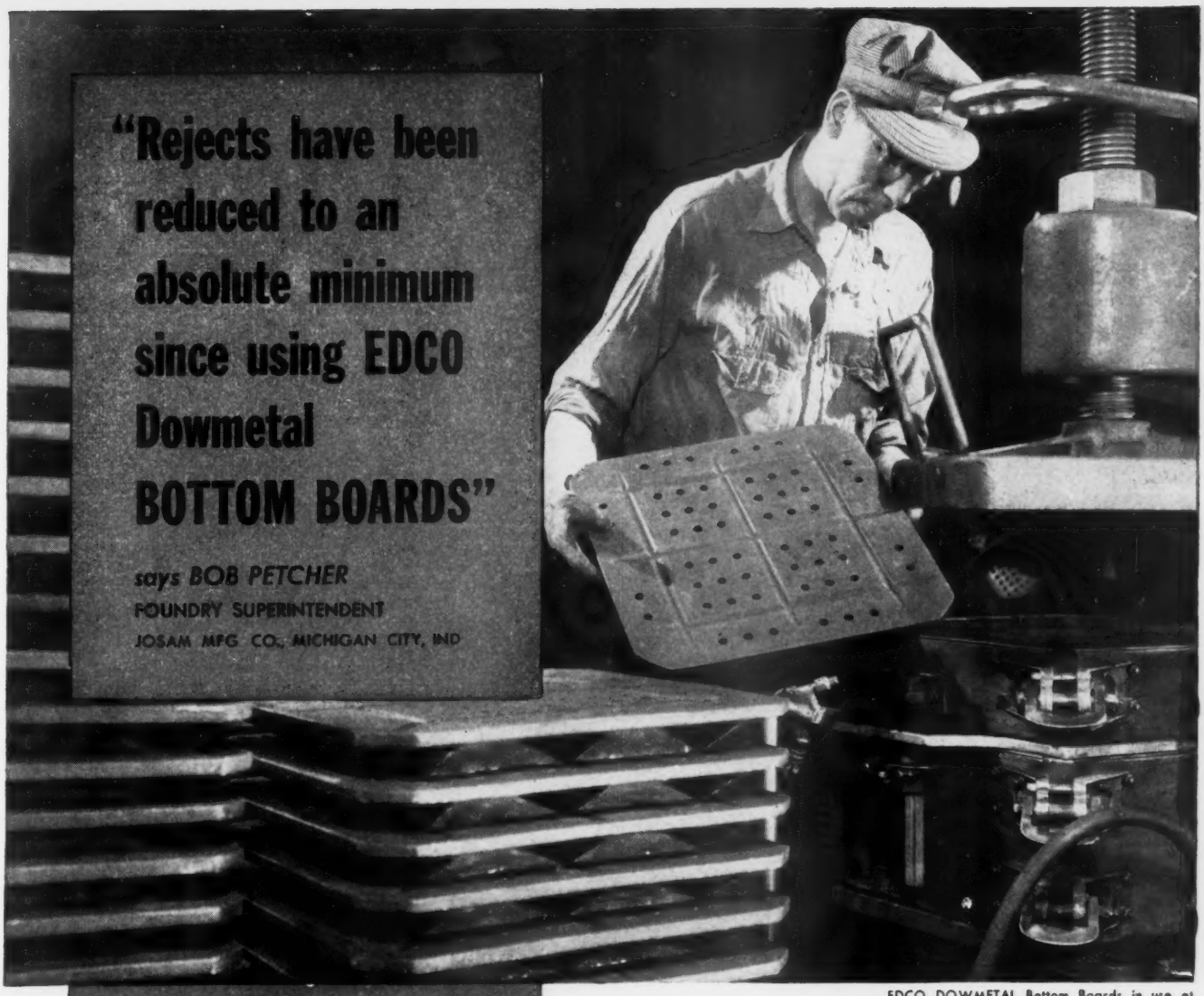
CHATTANOOGA 5, TENNESSEE

REPRESENTATIVES: M. A. BELL CO., 217 Lombard St., St. Louis, Mo. • 3201 Sherman St., Houston, Texas • 3430 Brighton Blvd., Denver, Colo. • CANADIAN FOUNDRY SUPPLIES & EQUIPMENT LTD., 4295 Richelieu St., Montreal 30, Quebec • 49 Main St., Toronto 14, Ontario • E. J. WOODISON CO., 7415 St. Aubin Ave., Detroit 11, Mich. • 146 Chandler St., Buffalo 7, N. Y. • FRED H. McGEE, 120½ E. 7th St., Chattanooga, Tenn. • SMITH-SHARPE CO., 117 27th Avenue, S. E. Minneapolis, Minn. • SNYDER FOUNDRY SUPPLY CO., 2444 East 57th Street, Los Angeles 58, California • INDIANA PRODUCTS CO., 400 Union Bank Bldg., Kokomo, Ind. • HOFFMAN FOUNDRY SUPPLY CO., 1193 Main Avenue, Cleveland, Ohio • EASTERN FOUNDRY SUPPLIES, INC., 109 Frelinghuysen Ave., Newark 5, New Jersey • SPRINGFIELD FACING CO., N. Chicopee St., Willimansett, Mass.

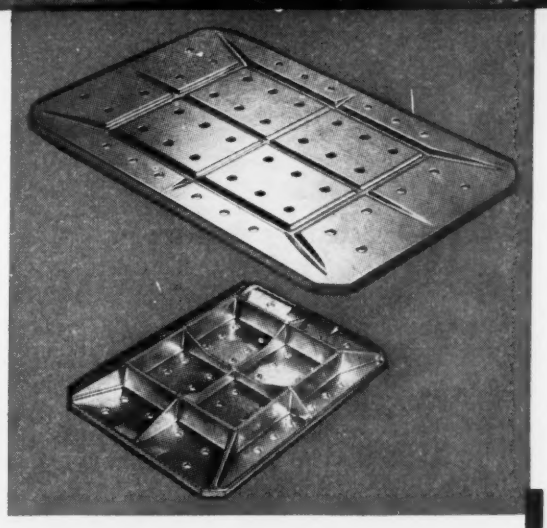
53rd YEAR OF CERAMIC LEADERSHIP

"Rejects have been reduced to an absolute minimum since using EDCO Dowmetal BOTTOM BOARDS"

says BOB PETCHER
FOUNDRY SUPERINTENDENT
JOSAM MFG. CO., MICHIGAN CITY, IND.



EDCO DOWMETAL Bottom Boards in use at Josam Manufacturing Company, world's largest manufacturer of plumbing drainage products



"Light, easy to handle, practically everlasting, EDCO DOWMETAL Bottom Boards have been a potent factor," says Petcher, "in improving our quality of castings and increasing our output.

"Our old wood boards had a life of about two weeks, and toward the end of their life-span, they always produced some poor castings which had to be rejected.

"EDCO Boards are just the opposite—they are *permanent equipment.* We've been using EDCO DOWMETAL Bottom Boards for more than four years—have used them almost 10,000 times—and they are still in perfect condition.

"These boards have paid for themselves many times over."

You, too, can save time, space and substantial cash sums by using EDCO DOWMETAL Bottom Boards.

They're easy to handle—light. They stack in small space, easily and securely. They last indefinitely—built for it.

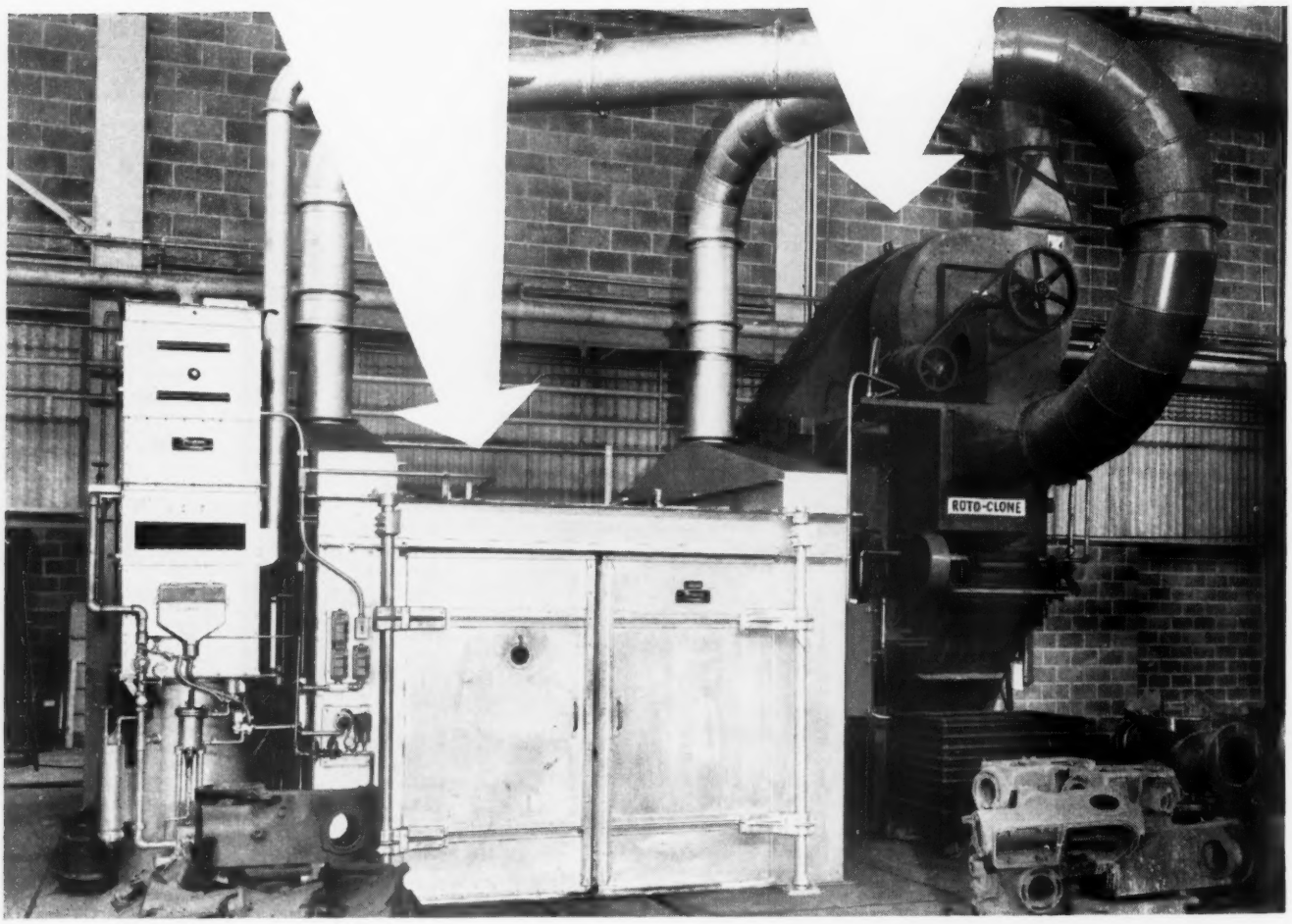
Above all, like Josam, you get better castings, fewer rejects—a big saving.

Write us, or phone MAnsfield 6-7330 for price schedule and list of 78 standard sizes available from stock.

CHRISTIANSEN CORPORATION

210 SOUTH MARION ST.
OAK PARK 1, ILLINOIS
ALUMINUM ALLOY INGOTS

Here's where DUST STORMS START and STOP



Type N ROTO-CLONE
Snuffs Out Dust Threat of Abrasive Cleaning Room

The dust storms created in this abrasive cleaning room never live to see the light of day. The reason is pictured at the right—a Type N ROTO-CLONE.* Exhausting the dust as fast as it is generated, this hydro-static precipitator converts it quickly into a harmless sludge.

This is but one of many types of abrasive cleaning operations where the Type N is keeping dust "under wraps". Its high cleaning efficiency results from the combined action of centrifugal force and thorough intermixing of water and dust-laden air.

There's no secondary dust problem as the material is collected as a sludge for easy disposal. And, as is evident from the picture, the Type N's compact design makes for important space savings.

Complete dust control costs no more, often less, than half-way measures. For complete information on Type N application to abrasive cleaning operations, call your local AAF representative or write for Bulletin 277.

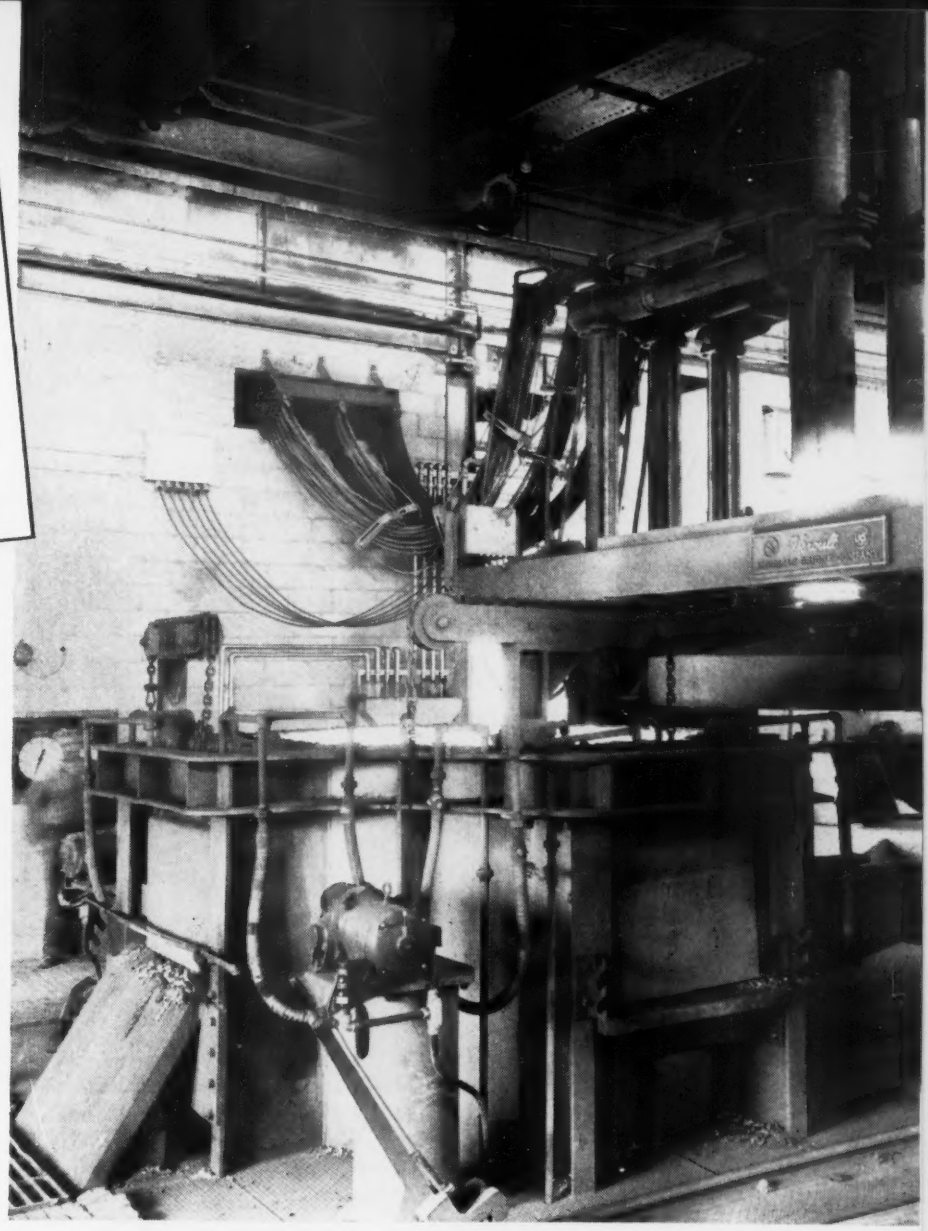
**ROTO-CLONE is the trade-mark (Reg. U. S. Pat. Off.) of the American Air Filter Company, Inc., for various dust collectors of the dynamic precipitator and hydro-static precipitator types.*

AAF

American Air Filter
COMPANY, INC.

American Air Filter of Canada, Ltd., Montreal, P. Q. • 266 Central Avenue, Louisville 8, Kentucky

Heroult
ELECTRIC MELTING FURNACES



The high production capacity of the Heroult makes it the foundryman's favorite furnace!

NEW CATALOGUE
Now Ready

Contains up-to-date information on Heroult Electric Melting Furnaces — types, sizes, capacities, ratings, etc. For free copy, write to our Pittsburgh office.

AVAILABLE in foundry sizes with either Gantry or swing-type roof, these widely used furnaces are equipped with the latest time- and labor-saving mechanical devices and electrical controls. They are noted for their efficient performance, low operating and maintenance costs.

We welcome an opportunity to help you select and install the foundry furnace best suited to your requirements.

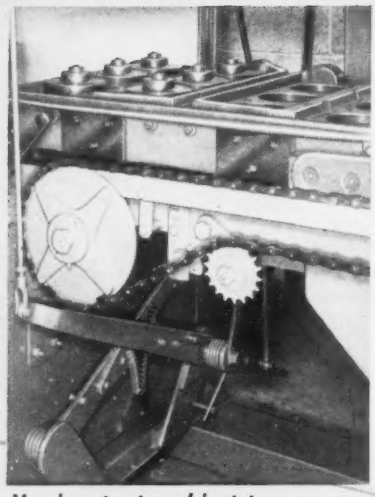
AMERICAN BRIDGE DIVISION, UNITED STATES STEEL CORPORATION
GENERAL OFFICES: 525 WILLIAM PENN PLACE, PITTSBURGH, PA.

Contracting Offices in New York, Philadelphia, Chicago, San Francisco and other principal cities.
United States Steel Export Company, New York

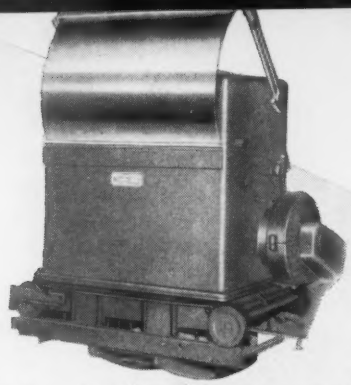
USS

UNITED STATES STEEL

2 MACHINES

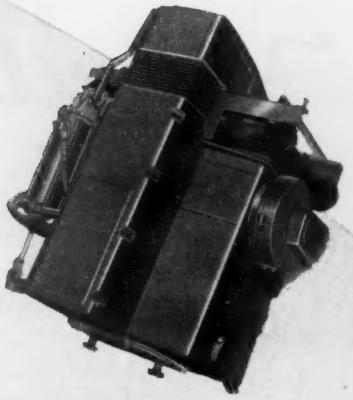


Moving parts subject to wear removed from contact with oven heat. New oven door and operating mechanism is faster, more positive and shock free.



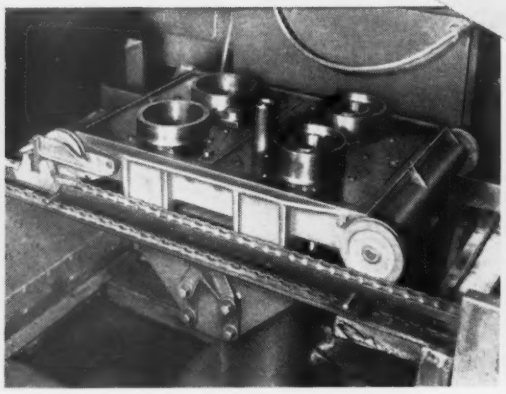
Carriage, with heated pattern, automatically clamped in position at bottom of investment chamber.

By the vertical drop of the sand-resin mix on surface of heated pattern dense shells are obtained and metal penetration is avoided.



At the conclusion of the investment time the investment chamber rotates 210° and recovers the excess sand-resin mix, returns to upright position, automatically releases carriage which then goes to curing oven.

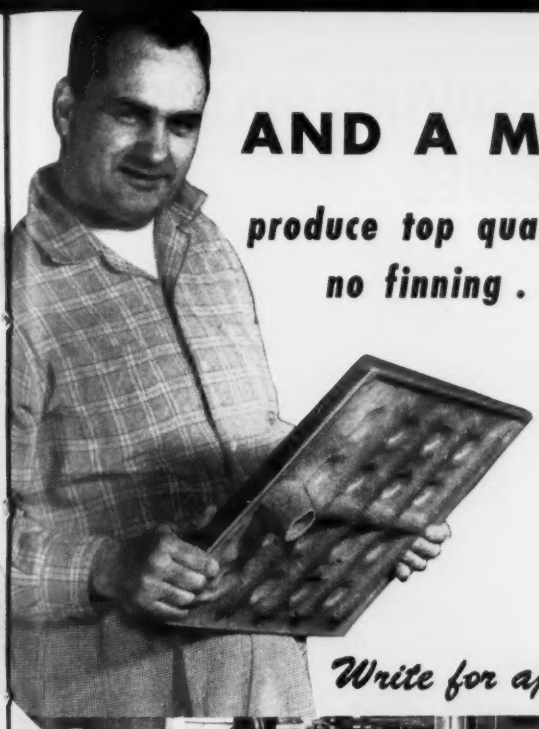
Shells quickly removed. Oil pressure thru an adjustable restriction controls the speed of ejection. Large diameter cylinder has an extremely long bearing providing positive square ejection stroke.



Large carriage takes 20 x 30 patterns. Only seconds needed to change patterns. No down time. Unique features allow quick pattern changes.

Our new Shell Molding Machine permits a much faster automatic cycle with greatly reduced maintenance attention. The outstanding production figures of our own foundry conclusively prove that this team of "2 Machines and a Man" is the most profitable shell molding set-up devised . . . for all foundries, large or small.

EARL W. JAHN, *President*
Shell Process, Inc.
Production Pattern and Foundry Co.



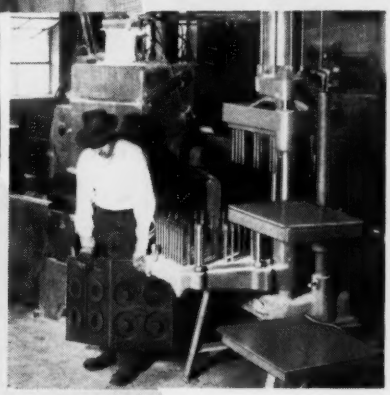
AND A MAN

produce top quality Shell Molds . . . ready for pouring in seconds no finning . . . Casting tolerances held across parting line

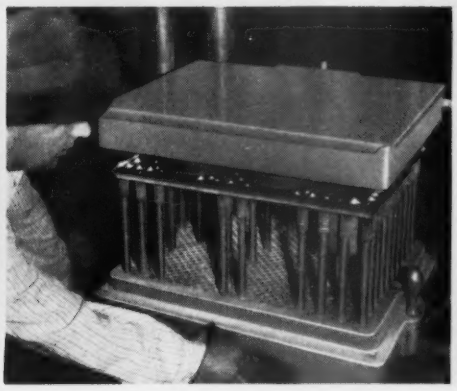
Simple as that! All three together (Shell Molding Machine, Shell Bonder, Unskilled Worker) make the perfect team for rapid production of Shell Molds.

This Shell Process molding team is loaded with time and labor saving features. The Shell Molding Machine is fully automatic, no skill required to run one or two machines with one operator. The Shell Bonding fixture completely eliminates the use of clips, staples or gadgets, yet provides a perfectly bonded shell ready for horizontal, vertical or diagonal pouring with little or no backup and *no casting finning.*

Write for appointment to see this shell molding team in action.



1. *Operator removes shell from molding machine and breaks in two, preparatory to placing on shell bonding fixture.*



2. *Operator applying bonding material on hot drag shell.*

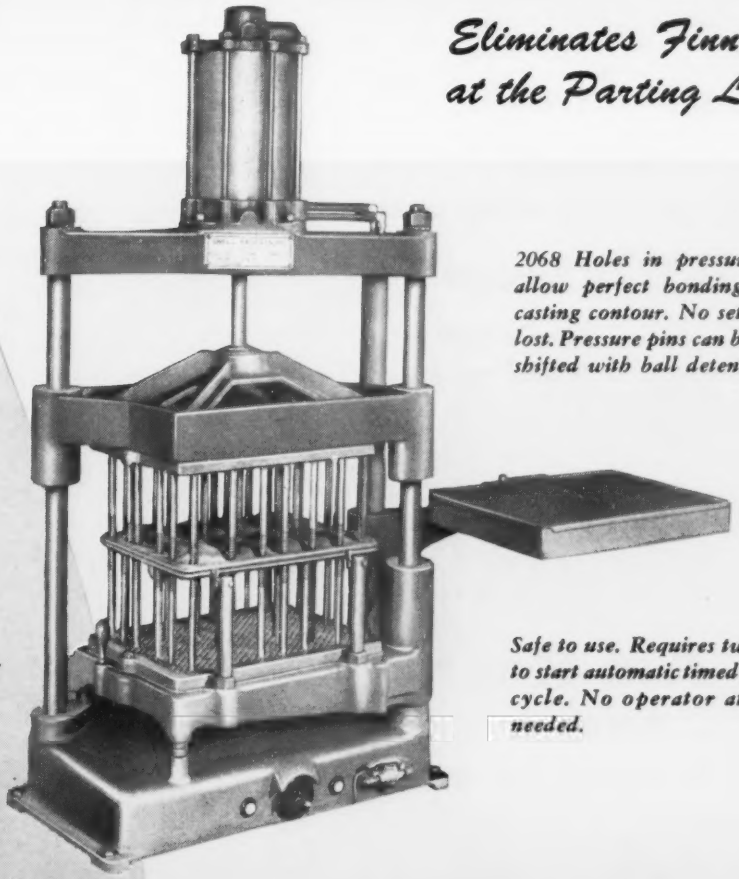
3. *Operator setting cores before closing shell and moving into pressure area.*

SHELL BONDING FIXTURE
provides perfectly bonded shells ready for pouring — in seconds

The Shell Bonder is the final, and most profitable step in the Shell Molding Process. The same unskilled worker now bonds shells perfectly, speedily, without clips, staples or gadgets. Practically a costless operation. With this complete team of "2 Machines and a Man" you are now ready for the most profitable shell molding operation possible. See this team in action. Write for an appointment.

SHELL PROCESS, INC.
Chicopee, Mass.

Eliminates Finning at the Parting Line



2068 Holes in pressure plates allow perfect bonding of any casting contour. No set-up time lost. Pressure pins can be readily shifted with ball detent lock.

Safe to use. Requires two hands to start automatic timed pressure cycle. No operator attention needed.

NEW COST-SAVING PROCESS FOR FOUNDRIES

The Airco Carbide Injection Process in use at the American Brake Shoe Company, Mahwah, N. J.

Carbide injection method developed by AIRCO® cuts ductile iron alloy costs up to 50 percent

permits melting in acid cupolas

Many foundries that have limited their production to gray iron will soon enter the ductile iron field, thanks to a new Airco development. Desulfurization of molten iron by injecting calcium carbide can reduce sulfur content to such levels that ductile iron can be melted in ordinary acid cupolas. At the same time, this sulfur content — as low as 0.01 percent — makes it possible to cut the amount of expensive alloy elements drastically with no sacrifice of mechanical properties. Foundries already using Airco carbide injection report savings of up to 50 percent on these alloy costs alone!

The injection equipment itself is simple and inexpensive. It consists of a hopper and an injection tube through which the powdered carbide is injected into the molten iron by a stream of nitrogen. The operating expenses are the cost of the gas and the carbide, trivial in comparison to the savings they make possible.

Calcium carbide injection is a fruitful result of Airco Technical Service's constant effort to find new profitable techniques for customers. If you have a welding, cutting or metallurgical problem, why not let Airco help you develop the most practical approach to it? It can pay big dividends.

AIR REDUCTION

60 East 42nd Street • New York 17, N. Y.

at the frontiers of progress you'll find...

AN AIR REDUCTION PRODUCT

Divisions of Air Reduction Company, Incorporated, with offices and dealers in most principal cities

Air Reduction Sales Company
Air Reduction Pacific Company

Represented Internationally by
Airco Company International

Foreign Subsidiaries: Air Reduction Canada Limited, Cuban Air Products Corporation

"On one contract alone

...the Blastmaster® saved us $8,000"

—reports Mathews Heat Treating Co.

Formerly, when a job had to be heat treated and blast cleaned, the Mathews Heat Treating Co., Newark, N.J., would sub-contract the blast cleaning operation. To eliminate this practice, Mathews bought a Pangborn Blastmaster Barrel. On just one contract, the savings made possible by this purchase amounted to $8000! In addition, the company has been delighted with the machine's versatility (handling everything from welding rods to large single pieces) and its "extremely reasonable operating costs." As for maintenance, Partner James R. Mathews says, "We have had almost no maintenance costs. The Blastmaster is really built to take punishment—we ride our equipment hard and run that barrel to the hilt. We are convinced the Blastmaster is a real quality machine."

Prove for yourself that the Pangborn Blastmaster Barrel *is* a quality machine! Investigate the Blastmaster now—and find out how you can get faster, better cleaning. In 1½, 3, 6, 12, 18, and 27 cu. ft. capacities. Write for Bulletin 223 to: PANGBORN CORPORATION, 1400 Pangborn Blvd., Hagerstown, Maryland.

For better cleaning at lower cost, Pangborn recommends the use of Malleabrasive® in your Blastmaster.

Pangborn

BLAST CLEANS CHEAPER

WITH THE RIGHT EQUIPMENT FOR EVERY JOB

MEMBER FEMA

•U. S. Patent 2184926 (others pending)

APPROVED and PROVED
NATION WIDE!

"SW" CUPOLA COLLECTOR PICKED FOR PERFORMANCE AND MONEY-SAVING VALUE

More and more foundries, small and large, are realizing the benefits from the performance of Schneible "SW" Cupola Collectors for control of cupola fly-ash and smoke.

Since such improvements are major expenditures it is important that purchase of *Cupola Collector* equipment be based on *proved performance* to assure maximum dollar value with minimum maintenance, and long usefulness.

Be sure to investigate the many benefits that are yours with Schneible "SW" Cupola Collectors, before you decide on any *similar* equipment. Only Schneible patented features gives you all the money-saving advantages.

YOUR BULLETIN ON REQUEST

For the complete story on the "SW" Cupola Collector write today for your copy of Bulletin No. 554.

CLAUDE B. SCHNEIBLE COMPANY
P. O. Box 81, North End Station Detroit 2, Michigan

EUROPEAN LICENSEE: ELEX S. A., ZURICH, SWITZERLAND
CABLE ADDRESS FOR FOREIGN INQUIRIES: CBSCO

SCHNEIBLE

PRODUCTS

Multi-Wash Collectors • Uni-Flo Standard Hoods • Uni-Flo Compsensating Hoods • Uni-Flo Fractionating Hoods • Water Curtain Cupola Collectors • Ductwork • Velocitrap • Dust Separators • Entrainment Separators • Settling and Dewatering Tanks • "Wear-Proof" Centrifugal Slurry Pumps

LATE NEWS

JULY 26 1954

MOBILIZATION PLANNING: Foundry industry representatives again are being called to Washington on mobilization base planning assignments. Five representatives of the steel castings industry are to be members of a study group in the Department of Commerce. With representatives of the Department of Defense the group will consider the following problems: 1.—How far short of mobilization requirements is our capacity to produce heavy steel castings (10,000 lb and over)? 2.—What is the approach for remedying any deficiencies that may be determined? All such groups will deal with classified information and the industry representatives invited to participate must have security clearance. Names of the industry representatives will not be announced until they have been cleared.

SAVING NICKEL: Mobilization planning groups of foundrymen also will be invited to Washington to help Iron & Steel Division, Business and Defense Services Administration find methods of conserving nickel in event of war. Invitations have gone out to representatives of the rolling mill roll producers. Nominations are being considered for a group from the high-alloy steel castings industry. A group on nickel conservation also will be appointed from the gray iron castings industry.

COSTS: Gray Iron Founders' Society, National City-East Sixth Building, Cleveland 14, is sending copy for "Cost Manual No. 2" to the printer and expects to have copies available in the fall. The publication deals with advance cost methods for gray iron foundries and is a companion presentation to the basic material in "Cost Manual No. 1."

CRITICIZE SCRAP EXPORTS: Government policy of granting licenses for export of copper scrap drew criticism at the recent Copper Industry Conference staged in Washington by the Department of Commerce, Business and Defense Service Administration. A representative of the custom smelting industry stated that continued copper scrap exports without limitations could at least imperil operations of that segment of the industry. A high BDSA official stated that until there is a finding of a shortage affecting the defense program and domestic need, the department is inclined to lean on the side of free trade.

1956 FOUNDRY SHOW: Atlantic City has been selected for the 1956 convention of the American Foundrymen's Society and the Foundry Show. Dates are May 3 to 9.

GOVERNMENT LOANS: Small Business Administration reports direct government loans to the following foundries: Duncan-Rohne & Co., North Hollywood, Calif., $60,000; E. V. Camp Steel Works, Atlanta, $150,000; and R & E Pattern & Foundry Corp., Elmira, N. Y., $50,000. Hanford Foundry Co., San Bernardino, Calif., secured a bank participation loan of $120,000.

SHELL MOLDING LAB: General Electric Co. Chemical Materials Department has established a new experimental shell molding foundry at Pittsfield, Mass., for testing resins and trouble shooting for foundry customers.

FOUNDRIES SAFER: National Safety Council reports member companies had the safest year on record in 1953. On-the-job accidents dropped and the accidents were less serious. Frequency rate for foundries was 10.94, a decline of 21 per cent from 1953. Severity rate for foundries remained at 1.05. Frequency rate for all industries was 7.44, a decline of 11 per cent and the severity rate was 0.83, a decline of 6 per cent.

FORD INCREASES CAPACITY: Cleveland Ford Foundry is adding new equipment which will permit increased production to meet needs of the new engine plant now under construction and scheduled for operation early in 1955. Changes include addition to the core oven capacity, extension of one molding line, installation of a new large blast cleaning cabinet and the building of a new patternshop so that the

maintenance department can utilize space of present patternshop. Approximately 1000 employees will be added to the foundry when the new engine plant begins operations. Currently, the foundry is working two shifts on Ford 6 and Mercury engine castings.

OBITUARY: Dr. Harry A. Schwartz, since 1920 manager of research, National Malleable & Steel Castings Co., Cleveland, died July 25. For many years, Dr. Schwartz also served on the editorial advisory staff of FOUNDRY.

SELLS IRON FOUNDRY: Haas Foundry Co., Racine, Wis., has sold its gray iron foundry to the Iroquois Foundry Co., Racine. The Haas organization will continue to produce aluminum castings and will manufacture electrical equipment.

NFFS SETS DEADLINE: Non-Ferrous Founders' Society, 192 N. Clark St., Chicago 1, reports a good response to the facilities survey now under way. A deadline of Aug. 31 has been established for filing the returns so that the coding and printing can be completed and copies delivered to government agencies and purchasing groups in October. Copies of the complete report will be sent to those supplying the desired data.

FOUNDRY TO CLOSE: Pulaski Foundry, General Chemical Division, Allied Chemical & Dye Corp., Pulaski, Va., will be closed about the end of August, according to company announcement.

PERSONALS: Fred J. Walls, metallurgist, International Nickel Co., Detroit, will present the Charles Edgar Hoyt lecture at the 1955 AFS convention in Houston May 23-27 . . . Cline H. Welch has been elected president and Keith A. Welch vice president and works manager, Alloy Cast Steel Co., Marion, O. . . . Samuel H. Cleland is retiring as Michigan manager, Eastern Clay Products Department, International Minerals & Chemical Corp., after 31 years of service. He will be succeeded by his son, Robert Cleland, formerly district sales manager.

PRICES OF FOUNDRY METALS AND COKE (As of July 26, 1954)

FOUNDRY COKE

(Per net ton, f.o.b. ovens)

BEEHIVE	
Connellsville	$16.50–17.00
OVEN	
Birmingham	$22.65
Chicago	24.50
Detroit	25.50
Erie, Pa.	25.00
Everett, Mass.	23.50
Indianapolis	24.25
Kearney, N. J.	24.00
Milwaukee	25.25
Painesville, O.	25.50
Philadelphia	23.00
Portsmouth, O.	24.00
St. Louis	26.00
St. Paul	23.75
Swedeland, Pa.	23.00
Terre Haute, Ind.	24.05

PIG IRON

(Per gross ton f.o.b. furnace)

	No. 2 Foundry	Malleable
Bethlehem, Pa.	$58.50	$59.00
Birmingham	52.88	....
Buffalo	56.50	57.00
Chicago	56.50	56.50
Cleveland	56.50	56.50
Everett, Mass.	61.00	61.50
Fontana, Calif.	62.50	....
Geneva, Utah	56.50	....
Granite City, Ill.	58.40	58.90
Lone Star, Tex.	52.50	52.50
Neville Island (Pittsburgh)	56.50	56.50
Steelton, Pa.	58.50	59.00
Swedeland, Pa.	58.50	59.00
Toledo, O.	56.50	56.50
Troy, N. Y.	58.50	59.00
Youngstown, O.	....	56.50

NONFERROUS INGOT

(Cents per pound, carlots)

BRASS AND BRONZE: Red brass, No. 115, 27.00; tin bronze, No. 225, 39.00; No. 245, 33.25; high-leaded tin bronze, No. 305, 31.50; No. 1 yellow, No. 405, 23.25; manganese bronze, No. 421, 26.75.

ALUMINUM: 99 per cent plus, primary ingots 21.50c. Secondary No. 12 alloy 19.25-19.75. Deoxidizing grades: No. 1 20.50-21.00; No. 4 17.50-18.00.

MAGNESIUM: 99.8 per cent standard ingots 27.00c, f.o.b. Freeport, Tex.

COPPER: Electrolytic 30.00, delivered Connecticut valley.

ZINC: High grade 12.35, delivered. Die casting alloy 15.00, delivered.

IRON AND STEEL SCRAP

(Consumer prices per gross ton delivered, except as otherwise noted)

	No. 1 Heavy Melting Steel	No. 1 Cupola Cast	Heavy Breakable Cast	Clean Auto Cast	Machinery Cast	Malleable	Short Steel Rails
Birmingham	$23.50–24.50	**$43.50–44.50	.....	.....	.....	.....	$40.00–41.00
Boston*	**17.50–18.00	**29.00–30.00	.....	.....	**32.00–33.00	.....	.....
Buffalo	26.00–27.00	**37.00–38.00	.....	.....	**41.00–42.00	.....	**40.00–41.00
Chicago	28.00–30.00	35.00–36.00	.....	37.00–38.00	37.00–38.00	40.00–42.00	43.00–45.00
Cincinnati*	**25.00–26.00	**38.00	**35.00	.....	**44.00	.....	**43.00–44.00
Cleveland	24.00–25.00	40.00–41.00	25.50–26.50	42.00–43.00	42.00–43.00	40.00–41.00	42.00–45.00
Detroit*	**19.00	**33.00	**24.00	**37.00	.....	**28.00	.....
Los Angeles	20.00	**38.00–42.00	.....	.....	.....	.....	.....
New York*	19.00	29.00–30.00	.....	.....	.....	.....	.....
Philadelphia	24.50	35.00	35.50	.....	41.00	37.00	42.00
Pittsburgh	28.00–29.00	35.00–36.00	29.00–30.00	.....	42.00–43.00	.....	43.00–46.00
St. Louis*	25.50	37.00	29.00	39.00	.....	.....	40.00
San Francisco	20.00	42.00–45.00	36.00	39.00	43.00	.....	.....
Seattle	25.00	**30.00–35.00	**25.00	.....	.....	.....	.....

* Brokers' buying prices. ** F.o.b. shipping point.

Get ALL THESE 12 ADVANTAGES IN ONE READY-TO-USE CORE PASTE

LYQUAGRIP*

1. Ready mixed, uniform at all times
2. Light colored, odorless, non-corrosive, non-fermenting
3. Dries rapidly at room temperatures
4. Unaffected by normal storage
5. Will not boil or blister
6. No appreciable gas generation
7. Pasted joints are stronger than core
8. Unaffected by mold humidity
9. Will not harm steel, brass, bronze
10. Extra strong, uses 1/3 to 1/5 as much paste
11. Cores may be reheated without damaging pasted joints
12. Washes off hands and tools easily with warm water

*Trade Mark Reg.

Send for Literature

Whitehead Brothers COMPANY

Established 1841

NEW YORK OFFICE
324 West 23rd St., New York 11, N. Y.

NEW ENGLAND OFFICE
17 Exchange Place, Providence, R. I.

Manufacturers of

LYQUAFLOUR
For cleaner surfaces, better shake-out

JOINT SEAL
Plastic Compound for perfect sealing

LYQUAFACE
The liquid sand grain coating

DOB-IT
Ready-to-use core mudding compound

Hundreds of hours longer . . .

NORBIDE® Pressure Blast Nozzles

outwear any other type

- 750 hours using silica sand
- 1500 hours using steel shot or grit
- Air consumption decreased from 10 to 20 per cent
- Stream contour and abrasive velocity maintained

For YOU, this means

More Service per Dollar

For full details on cost-cutting NORBIDE Nozzles, write for your free copy of Form 543.

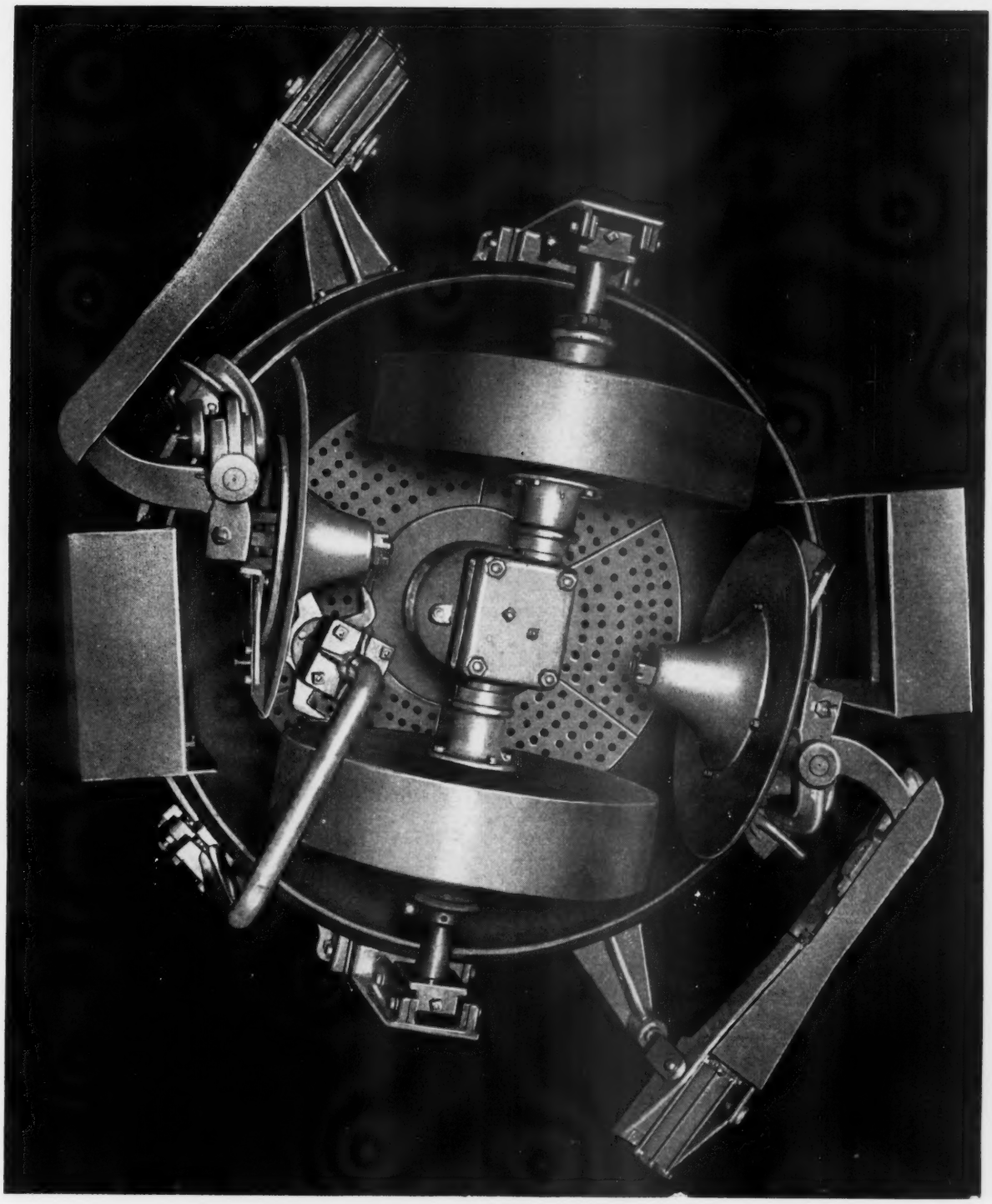
NORBIDE®... *the longest nozzle life you can buy*

NORTON
BORON CARBIDE

NORTON COMPANY

43 New Bond Street • Worcester 6, Mass.

Making better products . . . to make other products better



Double discharge points on opposite sides of Mixer furnished on special order only. Standard model has one discharge point.

you always get properly prepared sand with a . . .

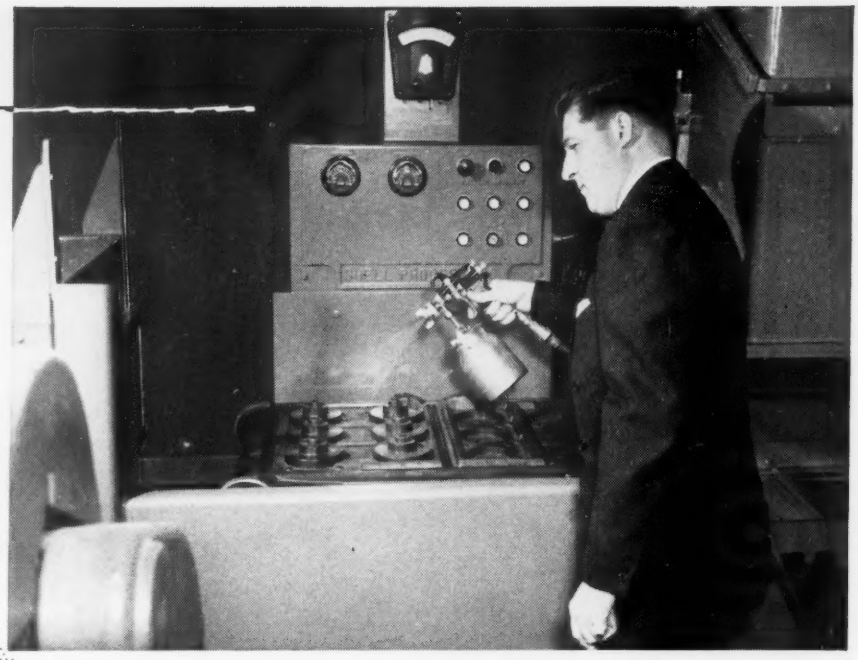
Clearfield Mixer

Proper preparation of sand for good foundry results is a matter of precision—and can be consistently accomplished only by equipment engineered, designed, and built to encompass all the many factors involved. And that's a perfect description of Clearfield Mixers. There's a Clearfield Mixer to meet any sand preparation need. Write today for catalog No. 83 for complete details.

CLEARFIELD
MACHINE COMPANY

CLEARFIELD
PENNSYLVANIA, U.S.A.

INCREASE SHELL MOLDING DEPENDABILITY



with

DOW CORNING 8 EMULSION

President E. W. Jahn of Shell Process, Inc., Chicopee, Mass., demonstrates proper spraying technique on their new, fully automatic TSM-4 shell molding machine. This new model incorporates a number of improvements including a fast-operating oven door, two-stage automatic oven heat control, readily interchangeable pattern carriage shoes, and an ejection platen large enough to permit placement of ejector pins around the outer edge of the shell.

... the Silicone Parting Agent that helps assure Fast, Continuous Production of Shell Molds and Cores at Low Costs

Easy release is the key to fast production of dependably accurate shell molds and cores at minimum cost. That's why alert production and management men specify Dow Corning 8 Emulsion.

Especially developed for the shell process, Dow Corning 8 Emulsion costs less, lasts longer and gives quick, effortless release from even the most complex and intricate patterns. Dimensional accuracy is retained through longer runs because this silicone release agent cannot break down to form a carbonaceous build-up on pattern surfaces. Pattern cleaning costs are held to a minimum; "stickers" are virtually eliminated.

Easily diluted in hard or soft water, Dow Corning 8 Emulsion is nonflammable, non-corrosive and highly resistant to creaming or separating in storage or after dilution. For more information and a free trial sample, mail the coupon today.

Send for FREE sample TODAY

DOW CORNING CORPORATION, Dept. AH-20.
Midland, Mich.

Please send me
- ☐ Free sample of Dow Corning 8 Emulsion
- ☐ Data on Silicone Release Agents for the Shell Process

Name _____

Company _____

Street _____

City _____ Zone ___ State _____

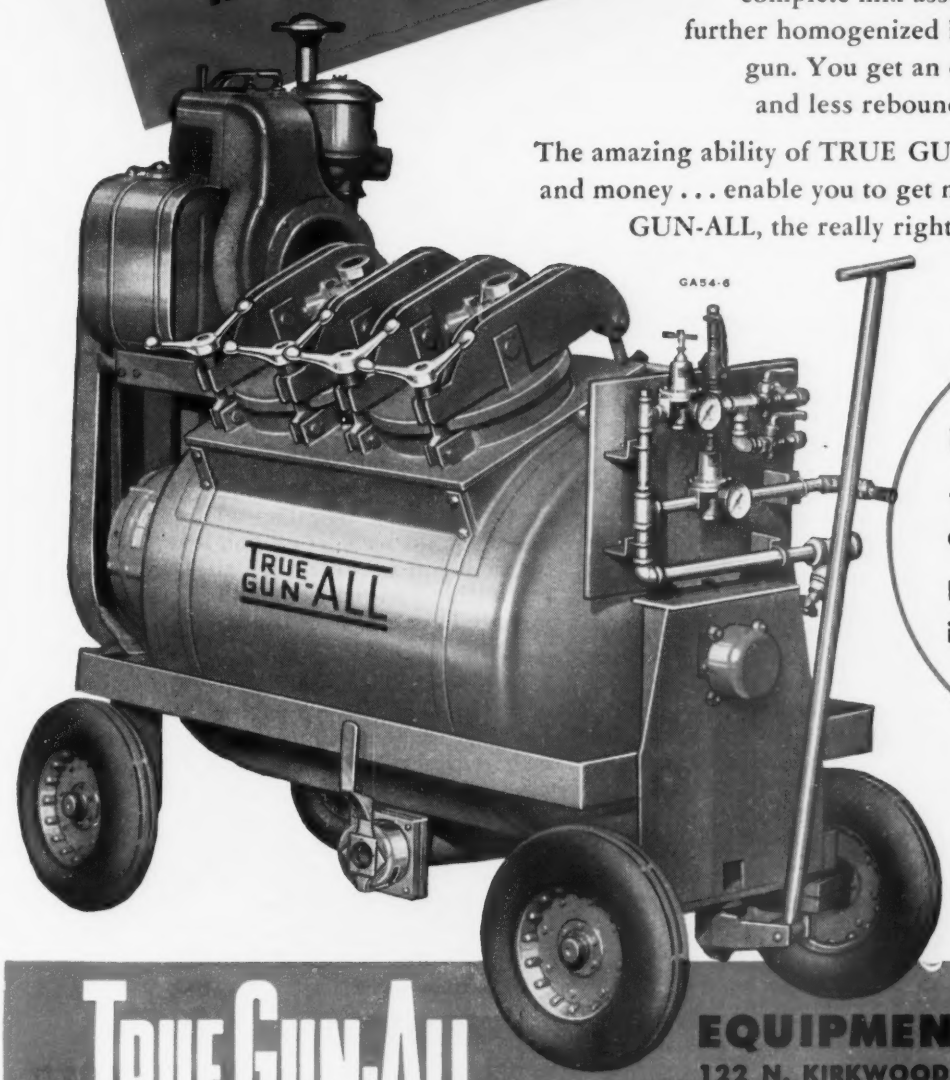
DOW CORNING DOW CORNING SILICONES **CORPORATION**
MIDLAND MICHIGAN

ATLANTA CHICAGO CLEVELAND DALLAS DETROIT LOS ANGELES NEW YORK WASHINGTON, D. C. (Silver Spring, Md.)

Canada: Dow Corning Silicones Ltd., Toronto — Great Britain: Midland Silicones Ltd., London — France: St. Gobain, Paris

REFRACTORIES APPLIED BY *New* METHOD

TRUE GUN-ALL
CONTROLLED WET MIX PREVENTS DUSTING AND REBOUND LOSS



Everyone recognizes the advantages of pressure gunning . . . but until TRUE GUN-ALL was perfected; it was impossible to apply refractories satisfactorily by this work-saving method. And TRUE GUN-ALL is the only equipment that can apply refractories satisfactorily because it uses a wet mix. The materials are thoroughly blended in the dual tanks, mixed with an exactly measured amount of water for proper consistency. The complete mix assures perfect adhesion and it is further homogenized by controlled air-action in the gun. You get an even texture without dry spots and less rebound loss with TRUE GUN-ALL.

The amazing ability of TRUE GUN-ALL can save you materials and money . . . enable you to get more done in less time. TRUE GUN-ALL, the really right way to gun materials and get all jobs done better, faster.

Let us prove our claims . . . with, no obligation, demonstration in your plant, with your material. Call, wire or write—

TRUE GUN-ALL
EQUIPMENT COMPANY
122 N. KIRKWOOD RD, ST. LOUIS 22, MO.
Telephone: YOrktown 5-4650

Rugged NEW SHOVELOADER mechanizes bulk handling for only $3395.00*

For LESS than $10.00 a day for one year . . . much less than you pay a laborer with a hand shovel . . . you can own a Baker-Lull 12 cubic foot SHOVELOADER. And you get a lot more for the money!

Check all of these features and see why this SHOVELOADER compares with others costing $350 to $400 more. The lift height is a tall seven feet with lifting capacity a husky 1500 pounds . . . 500 pounds more than most competitive units. The loader arms are located out in front of the operator—not around him—to keep him safe from injury and give him clear-view visibility at all times. The bucket can be cradled low too, giving him unobstructed forward visibility and making it unnecessary to drive backward as with other units. Maximum travel speed is 14 MPH. Plenty of bucket tilt back at ground level makes it easy to get a full bucket every time from stockpiles . . . letting you reduce handling costs by moving more bulk in a shorter time.

Attachments let you do more types of work too. Lift forks let you handle palletized loads, the crane hook gives you a portable hoist, and special buckets are available for handling dense materials. Exhaust-destroying catalytic equipment is also available for indoor use where necessary.

Baker-Lull SHOVELOADERS are available in sizes ranging from 12 cubic feet to 1½ cubic yards four wheel drive. Should you desire information on other sizes please specify when writing. The BAKER-LULL Corporation, 325 West 90th Street, Minneapolis 20, Minn.

*F.O.B. Minneapolis

THE BAKER-LULL CORPORATION,
325 West 90th Street • Minneapolis 20, Minn.

Please send full information on the Baker-Lull, Model 20, 12 cu. ft. SHOVELOADER which sells for only $3395.00.

NAME.....

COMPANY.....

ADDRESS.....

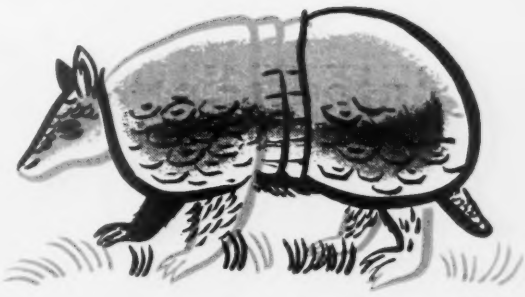
CITY.....STATE.....

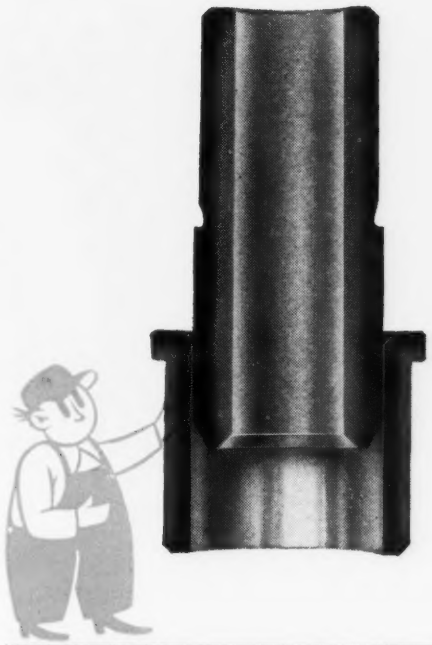
Baker Lull
handling equipment

SHOVELOADER

designed like an ARMADILLO

hardened wearing surfaces and ductile cores increase life of UNIVERSAL flask pins and bushings





Universal flask pins and bushings are double quenched and double drawn to produce strong, ductile cores with a fine grain structure to enable them to withstand considerable stress, strain and rough treatment in the foundry without breaking or chipping. The wearing surfaces of both pins and bushings are carburized and hardened to improve their wearing qualities and prolong their life. Universal flask pins and bushings are precision ground to extremely close tolerances to help assure instant, accurate alignment of cope and drag. Plain or taper, round or hexagonal and threaded or plain types are available in a complete range of sizes. For complete information, write to the office nearest you — Universal Engineering Sales Co., 1060 Broad St., Newark 2, N. J.; 5035 Sixth Avenue, Kenosha, Wis. — or the home office.

175

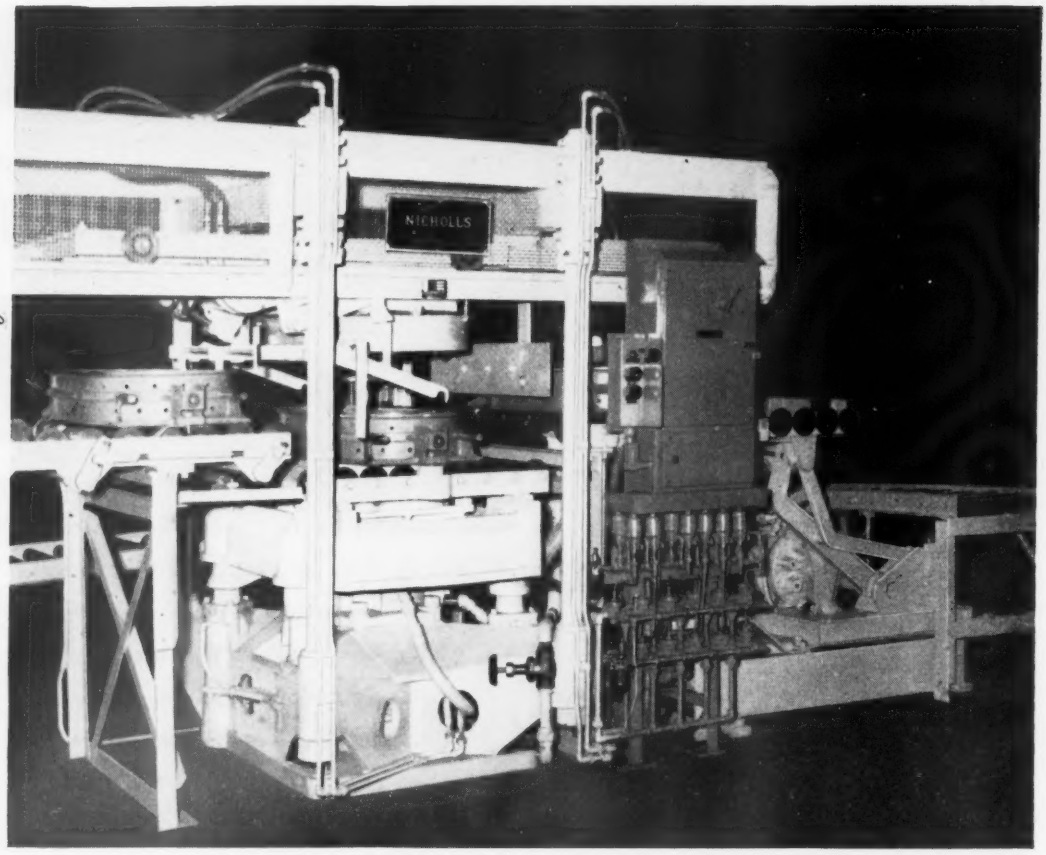
UNIVERSAL ENGINEERING COMPANY FRANKENMUTH 4, MICHIGAN

NICHOLLS

New Automatic "Push-Button" Molding Machine Is Simple and Economical To Operate

No. 21 Type C.F.—Jolt, Squeeze and Pattern Draw—Automatic-Push Button Control

(Also Made in Smaller and Larger Sizes)



From start to finished mold, the Nicholls #21 Type CF Jolt, Squeeze and Pattern Draw Molding Machine is push-button controlled to eliminate dangerous risks, costly mistakes—to give you better molds *continuously*. Precision built for long years of service... made with all the safety devices, the hidden "quality points" that reduce maintenance costs... the know-how that almost half a century of building quality molding machines has made possible. If you're interested in better quality molds at lower cost—investigate these machines now. *For complete information, write to:*

Wm. H. Nicholls Co., Inc., Richmond Hill 18, Long Island, N. Y.

NICHOLLS

HOW TO PUT THE SQUEEZE ON BLAST CLEANING COSTS

U. S. Patent #2184926
(other patents pending)

. . . ***USE MALLEABRASIVE, SHOT OR GRIT.*** Scientifically heat-treated for durability, Malleabrasive lasts longer. Laboratory controlled for strength and consistency, Malleabrasive cleans better faster. And because it does a better job in less time with fewer refills, Malleabrasive cleans *cheaper!* See for yourself. Next time you order blast cleaning abrasive, specify Malleabrasive from Pangborn Corp., 1400 Pangborn Blvd., Hagerstown, Maryland.

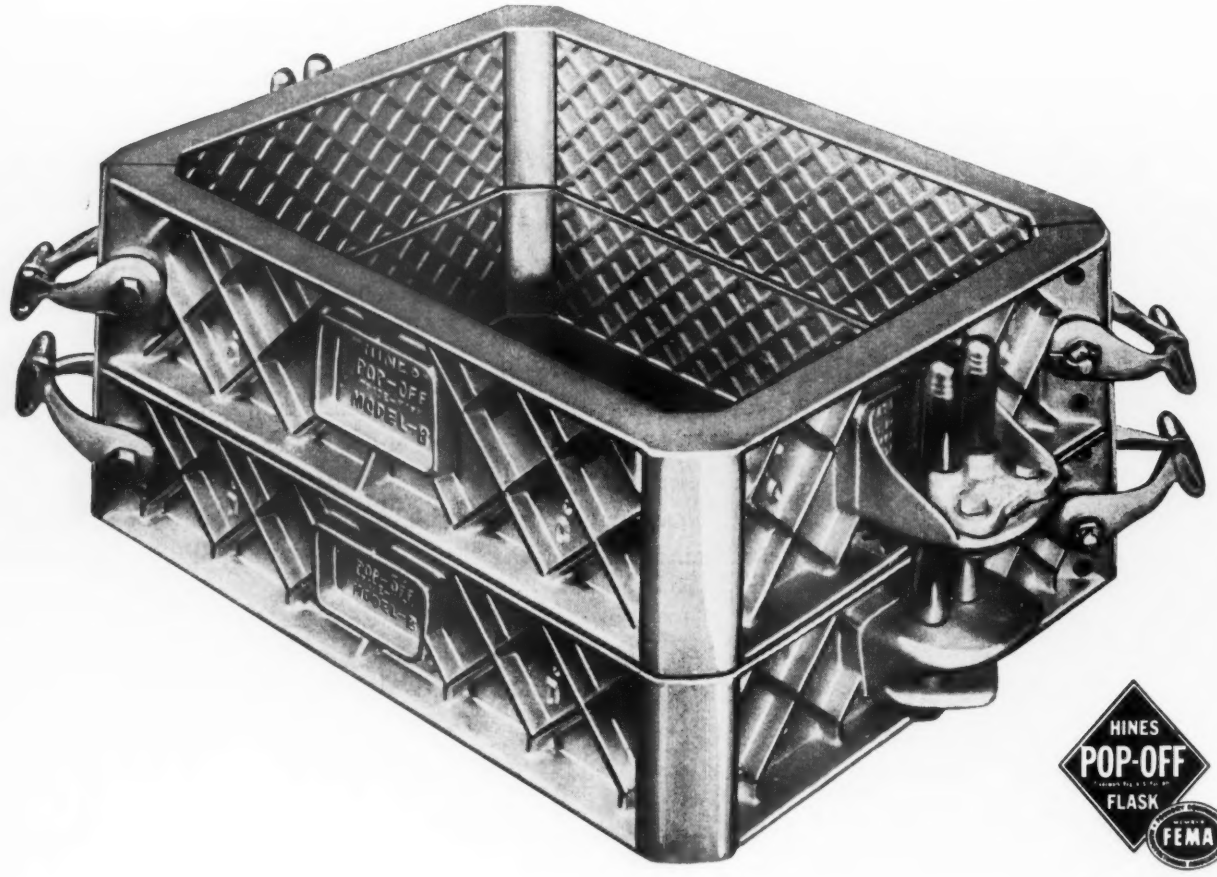
Pangborn DISTRIBUTORS FOR

MALLEABRASIVE®

PANGBORN'S 50th ANNIVERSARY—1904-1954

it's axio

Standard Hines aluminum "Pop-Off" flask. Simply move the levers and off it pops, no matter how heavily the sand is rammed. Choice of single or double pins—round, hexagon or "V" type. Handles, trunnions and reinforcing rods available, as required.



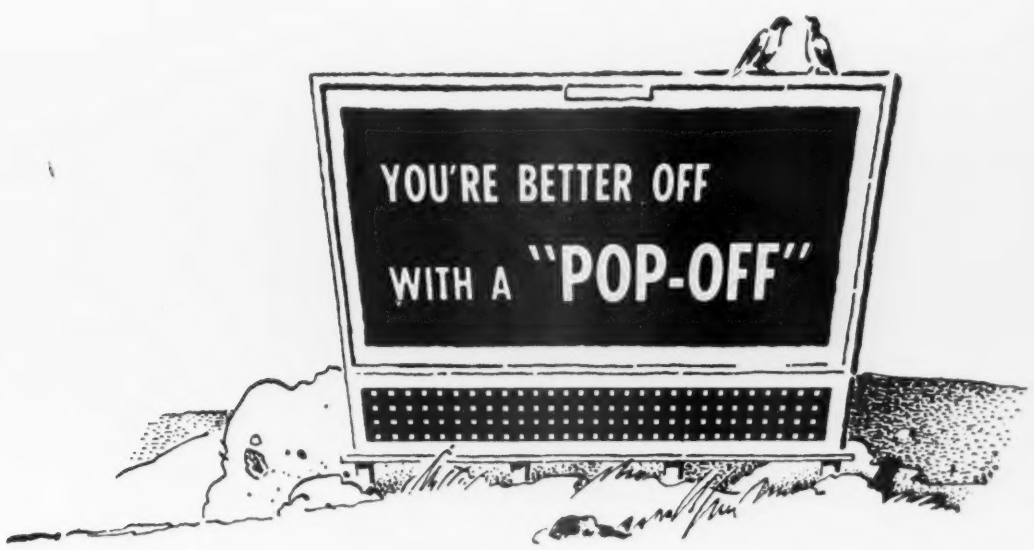
HINES
POP-OFF
FLASK
FEMA

THE

matic

To get good castings and hold scrap loss to a minimum . . . . the most important thing to do is use good flasks!

And this is axiomatic, too . . . .



E HINES FLASK CO.

3431 WEST 140TH STREET • CLEVELAND 11, OHIO • PHONE ORCHARD 1-2806

Why, of course the answer is Yes

"foundries that use SMITH L-O CORE OIL are always satisfied with results"

Accident and chance play no part in the good results foundries get with Smith L-O Core Oil. That's because this uniform, high-quality binder is available in grades to suit specific applications. And, Smith foundry service men recommend the proper grade based on their thorough analysis of each customer's casting conditions.

If you are confronted with a particularly tough core problem, it will be to your advantage to call in a Smith representative for consultation.

It is for this reason that we say: *Look first to Smith L-O, the name that stands for a service as well as a product.*

SMITH REPRESENTATIVES

- COLUMBIAN WAREHOUSE CO. Reading, Pennsylvania
- FOUNDRIES MATERIALS CO. Coldwater, Michigan
- FOUNDRY SERVICE CO. Birmingham, Alabama
- F. F. SHORTSLEEVE Elmira, New York
- MALCOLM G. STEVENS Arlington, Massachusetts
- PACIFIC GRAPHITE CO., INC. Los Angeles 22, California
- ST. LOUIS COKE & FOUNDRY SUPPLY CO. St. Louis, Missouri
- WESTERN FOUNDRY SAND CO. Seattle, Washington
- WESTERN INDUSTRIAL SUPPLY CO. Portland 14, Oregon

Smith L-O Core Oil

ROD DIP LIQUID PARTING

SMITH OIL & REFINING CO.

MANUFACTURERS OF L-O AND CERTIFIED CORE OILS
INDUSTRIAL OILS DIVISION • ROCKFORD, ILLINOIS

the starting point

for better castings at lower cost...

COLEMAN OVENS

The only complete line of Core and Mold Ovens made in every type for every method to fit YOUR requirements BEST!

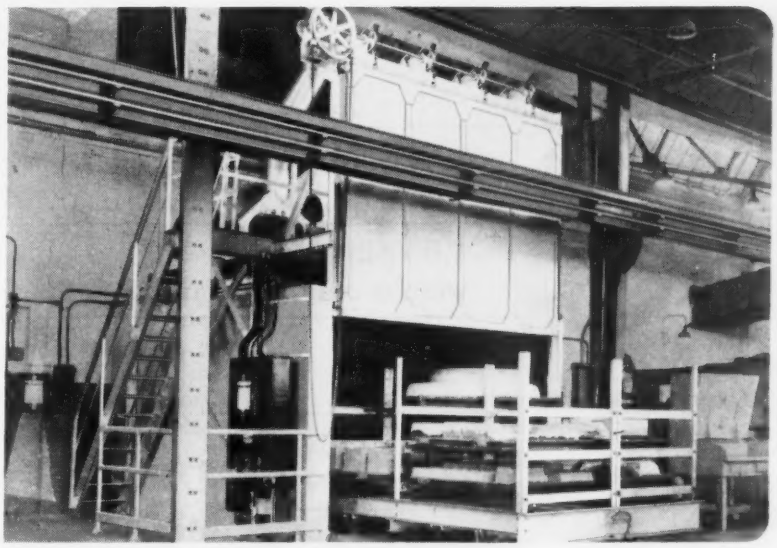
For better quality castings...for immediate savings in labor, materials and fuel, for consistently uniform baking of cores and molds at lower cost, install Coleman Ovens. Large and small foundries find Coleman Ovens are essential in producing castings to meet the most exacting specifications.

Performance records prove that Coleman Ovens may reduce overall core department costs by as much as 50%. Such savings mean increased profits and rapid amortization of the oven cost. Many Coleman Ovens have paid for themselves in less than a year!

Coleman Core and Mold Ovens provide exclusive features resulting from over 50 years of specialization in the design and construction of foundry ovens and over 10,000 installations in leading foundries. *As builders of the world's only complete line of foundry ovens, we have no reason to recommend any but the oven best suited to your requirements.*

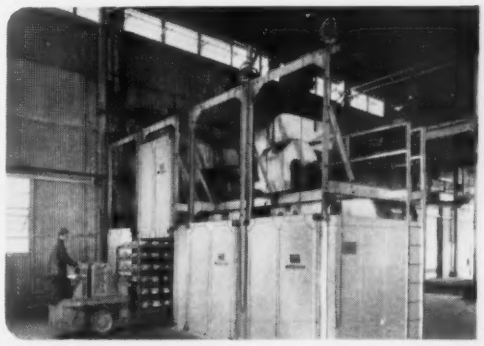
Experienced Coleman Engineers are ready to help you with your foundry oven needs without obligation. Now, with production savings so important it will pay you to investigate the unusual advantages of Coleman Ovens.

Write today for Bulletin 54

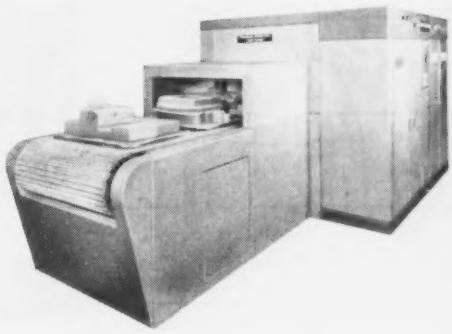


Coleman Car-Type Oven

Coleman Tower Oven



Coleman Transrack Ovens



Coleman Dielectric Core Oven

A COMPLETE RANGE OF TYPES AND SIZES...

for every core baking and mold drying requirement:

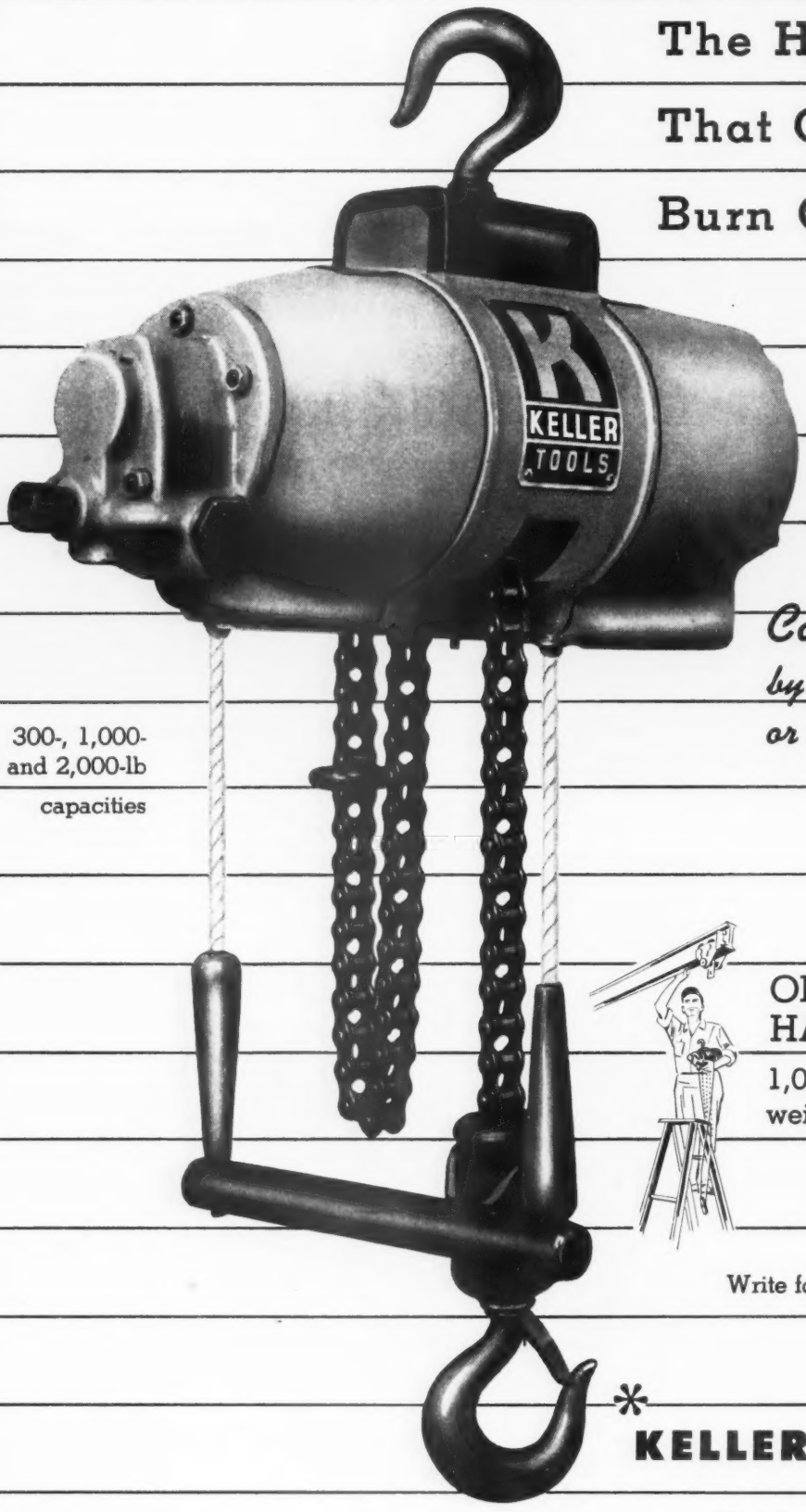
Tower Ovens • Horizontal Conveyor Ovens
Car-Type Core Ovens • Car-Type Mold Ovens
Transrack Ovens • Rolling Drawer Ovens
Portable Core Ovens • Portable Mold Dryers
Dielectric Core Ovens

THE FOUNDRY EQUIPMENT COMPANY
1821 COLUMBUS ROAD **CLEVELAND 13, OHIO**

WORLD'S OLDEST AND LARGEST FOUNDRY OVEN SPECIALISTS

KELLER

The Hoist That Can't Burn Out !



Can't Overheat
from rapid reversals

Can't Be Damaged
by continuous service
or stalling under load

300-, 1,000- and 2,000-lb capacities

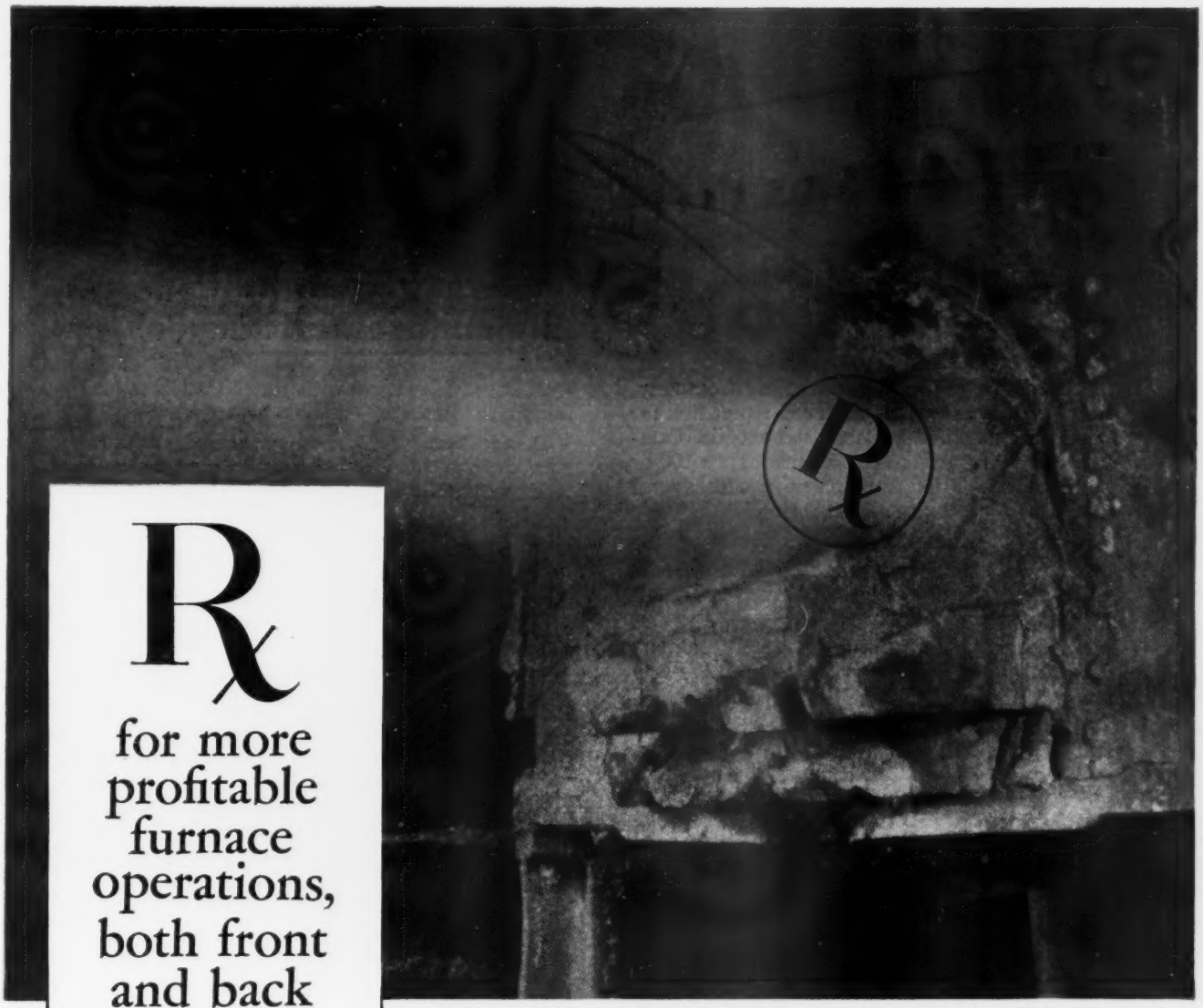
ONE MAN HANDLES IT EASILY

1,000-lb hoist weighs only 28 pounds

Write for Catalog 86

KELLER AIR HOISTS

KELLER TOOL COMPANY
1323 FULTON ST., GRAND HAVEN, MICH.



Rx for more profitable furnace operations, both front and back slagging . . .

You can maintain hot metal schedules for your casting line and avoid costly shutdowns by using Norton *engineered and prescribed* CRYSTOLON refractories — slag hole blocks for back slagging cupolas, bricks and cement for front slagging cupolas.

Norton CRYSTOLON* refractories

If too much cupola down-time is slowing your metal-melting operation and cutting your profits, here's a Norton Rx to solve your problem:

Standardize on CRYSTOLON refractories — *engineered* for highest efficiency in the handling of neutral and acid cupola slags.

For back slagging cupola the Rx is CRYSTOLON slag hole blocks. For capping the notch and lining the slag chute in front slagging cupolas it's CRYSTOLON bricks and cement.

Wherever you use it, this top-quality refractory material will stand up under temperatures up to 3050°F without softening, spalling or cracking. Its extreme density assures exceptional resistance to slag penetration and chemical attacks — and it has 5 to 15 times the resistance of ordinary fire clay to erosion and corrosion.

In your own production, these advantages mean more continuous, more trouble-free furnace operations, at lower cost. CRYSTOLON bricks and blocks are made in sizes and shapes to meet every foundry requirement. For complete facts, see your Norton Representative. Or write to NORTON COMPANY, 307 New Bond St., Worcester 6, Mass. *Canadian Representative:* A. P. Green Fire Brick Co., Ltd., Toronto 5, Ontario.

NORTON

REFRACTORIES

Engineered . . . Rx . . . Prescribed

Making better products . . . to make other products better

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

Here's part of the secret of R. H. Osbrink's process

Close tolerance casting in West Coast plant aided by processing cores in Foundromatic dryer

The R. H. Osbrink Manufacturing Company, Los Angeles, has a well-deserved reputation for precision and flawless casting of metals. Castings in which internal cored finishes are 100 or better micro-finish, and castings with a wall thickness of 0.100 inch are routine.

What's the secret of this precision?

Men who have studied the R. H. Osbrink Co. operations say it is a passion for detail . . . and up-to-date equipment.

One example is the modern Allis-Chalmers dielectric sand core dryer. It helps solve two major problems.

1. It provides cores with high dimensional stability — no sag, no slump.

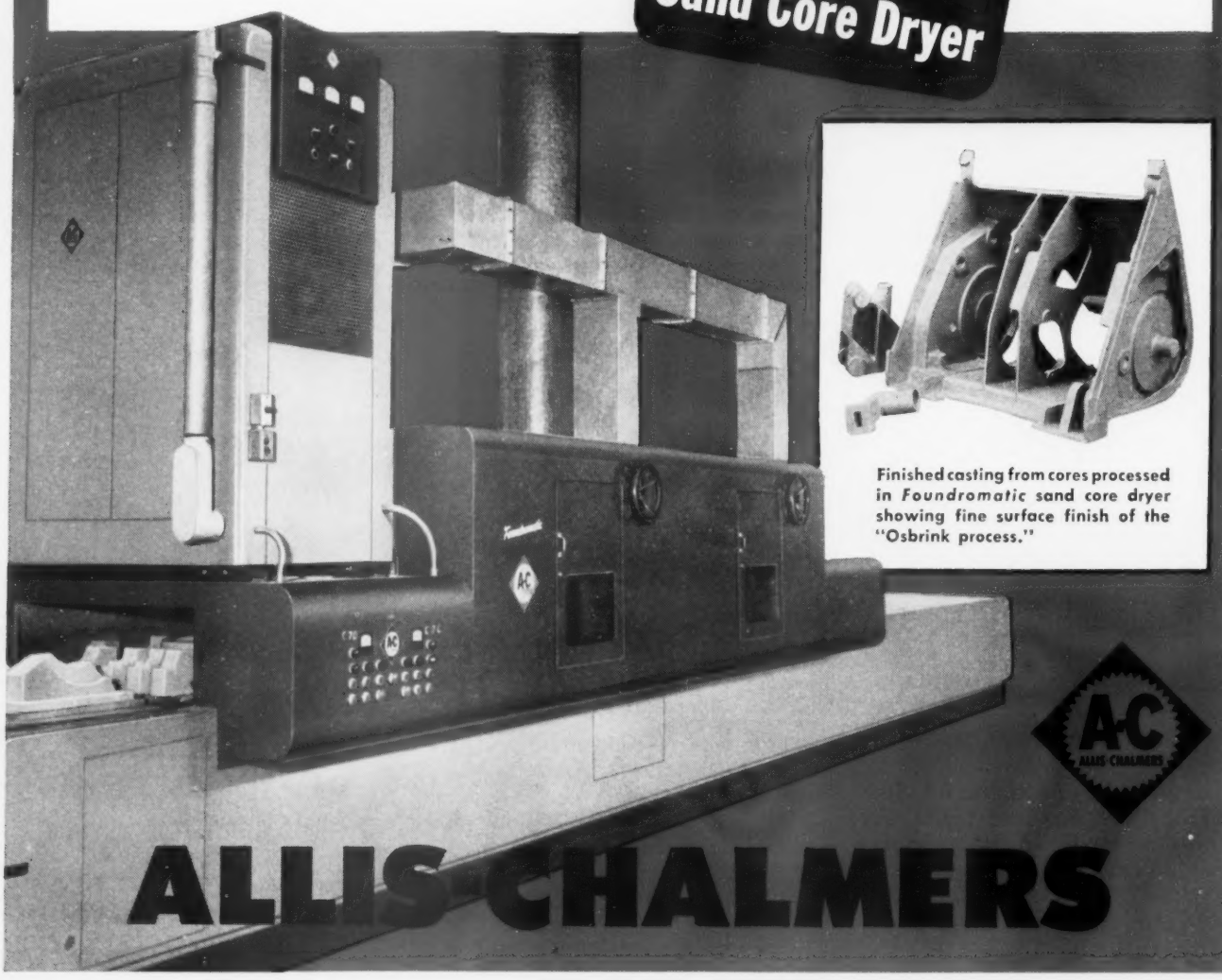
2. It provides cores with smooth surfaces for fine-finish castings.

In addition, the *Foundromatic* dryer cuts core drying time from hours to minutes and reduces handling time.

Get complete information on the *Foundromatic* dryer by calling your nearby Allis-Chalmers office. Or send for Bulletin 15B7306C. Allis-Chalmers, Milwaukee 1, Wisconsin. A-4365

Foundromatic is an Allis-Chalmers trademark.

ALLIS-CHALMERS Dielectric Sand Core Dryer



Finished casting from cores processed in *Foundromatic* sand core dryer showing fine surface finish of the "Osbrink process."

ALLIS-CHALMERS

Dear Reader:

This page has been provided for your convenience. Use one of the return cards attached for *more information* on advertisements in this issue.

FURTHER INFORMATION on any of the advertisements in this issue may be obtained by circling the page numbers of advertisements on one of the attached cards. Fill in your name and address, return your card to us—we'll forward your requests to the companies concerned. Further information on their advertisement will come direct to you from the advertiser. *Note: where more than one advertisement appears on a page, the following code is used for identification:* R (right); L (left); T (top); B (bottom); 1-2-3-4 (in order from top to bottom); IFC (inside front cover); IBC (inside back cover); OBC (outside back cover).

• For further information on helpful literature, trade publications, and new equipment descriptions, please refer to IDEAS FOR FOUNDRYMEN insert and return cards on page 267.

FOUNDRY Readers Service

FIRST CLASS
Permit No. 36
(Sec. 34.9 P.L.&R.)
Cleveland, Ohio

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

4c POSTAGE WILL BE PAID BY—

FOUNDRY
Penton Building
Cleveland 13, Ohio

Readers Service Dept.

AUGUST 1954

IFC	30	60	147	182-3	218	238T	247TL
1	31	61	148	185	219	238B	247BL
2	32	62-63	151	187	220L	239	248Li
4-5	35	64	153	188	220R	240T	248L2
6	36	65	154	190-1	221	240B	248L3
7	37	66	155	192	222	241R	248R1
8	38	67	156	193	223	242L	248R2
9	39	68	157	194	225	242TR	248R3
10	40	101	158	195	227	242BR	248-4
11	41	103	159	198	228	243T	249T
12	42	107	160-1	201R	229	243BR	249BR
13	43	108	162	201L	230L	243BL	249BL
14-15	44-45	111	163	202	230R	244T	250TL
16	46	114	165	203	231	244BL	250BL
17	47	116-7	167	205	232	244BR	250R1
18	48	127	168	206	233T	245R	250R2
19	49	129	169	207	233B	245TL	250R3
20	50	130	171	208	234L	245BL	251R
21	53	133	172	209	234R	246L	251L1
22-23	54	134	173	210	235T	246R1	251L2
24	55	136-7	175	211	235B	246R2	251L3
25	56	139	177	213	236T	246R3	264
26	57	140	178	215	236B	246R4	IBC
27	58	142-3	179	216	237T	247R	OBC
28-29	59	145	180	217	237B		

THIS CARD VALID FOR USE IN UNITED STATES AND CANADA ONLY

PLEASE SEND further information on the advertisements appearing on the pages which are circled above.

NAME

TITLE

COMPANY

ADDRESS

CITY & STATE

This card MUST be completely filled out. Please TYPE or PRINT

IFC	30	60	147	182-3	218	238T	247TL
1	31	61	148	185	219	238B	247BL
2	32	62-63	151	187	220L	239	248Li
4-5	35	64	153	188	220R	240T	248L2
6	36	65	154	190-1	221	240B	248L3
7	37	66	155	192	222	241R	248R1
8	38	67	156	193	223	242L	248R2
9	39	68	157	194	225	242TR	248R3
10	40	101	158	195	227	242BR	248-4
11	41	103	159	198	228	243T	249T
12	42	107	160-1	201R	229	243BR	249BR
13	43	108	162	201L	230L	243BL	249BL
14-15	44-45	111	163	202	230R	244T	250TL
16	46	114	165	203	231	244BL	250BL
17	47	116-7	167	205	232	244BR	250R1
18	48	127	168	206	233T	245R	250R2
19	49	129	169	207	233B	245TL	250R3
20	50	130	171	208	234L	245BL	251R
21	53	133	172	209	234R	246L	251L1
22-23	54	134	173	210	235T	246R1	251L2
24	55	136-7	175	211	235B	246R2	251L3
25	56	139	177	213	236T	246R3	264
26	57	140	178	215	236B	246R4	IBC
27	58	142-3	179	216	237T	247R	OBC
28-29	59	145	180	217	237B		

THIS CARD VALID FOR USE IN UNITED STATES AND CANADA ONLY

PLEASE SEND further information on the advertisements appearing on the pages which are circled above.

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

CITY & STATE _____

This card MUST be completely filled out. Please TYPE or PRINT

FIRST CLASS
Permit No. 36
(Sec. 34.9 P.L.&R.)
Cleveland, Ohio

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

4c POSTAGE WILL BE PAID BY—

FOUNDRY
Penton Building
Cleveland 13, Ohio

Readers Service Dept.

Dear Reader:

This page has been provided for your convenience. Use one of the return cards attached for *more information* on advertisements in this issue.

FURTHER INFORMATION on any of the advertisements in this issue may be obtained by circling the page numbers of advertisements on one of the attached cards. Fill in your name and address, return your card to us—we'll forward your requests to the companies concerned. Further information on their advertisement will come direct to you from the advertiser. *Note: where more than one advertisement appears on a page, the following code is used for identification:* R (right); L (left); T (top); B (bottom); 1-2-3-4 (in order from top to bottom); IFC (inside front cover); IBC (inside back cover); OBC (outside back cover).

● For further information on helpful literature, trade publications, and new equipment descriptions, please refer to IDEAS FOR FOUNDRYMEN insert and return cards on page 267.

FOUNDRY Readers Service

Thermex
ELECTRONIC CORE-BAKING EQUIPMENT

HOW YOU CUT COSTS

when you cut baking time 96%

One of two 60 KW THERMEX Electronic Core Baking Units at James B. Clow & Sons, Coshocton, Ohio. Modernization of this core room has cut manhours 33%.

BEFORE MODERNIZATION of this foundry, core-baking time with old ovens was 16 hours. Now, with two 60 KW THERMEX* Core Baking Units, baking time is only 30 minutes. The advantages of this 96% savings in baking time are:

1. Improves core quality. They don't sag. They are stronger. Their surface is smoother and harder.

2. Cuts handling costs. Rammers place cores directly on conveyor of baking unit. After baking, cores are placed on skid, ready for use.

3. Cuts storage space. Cores move continuously from sand rammer to molding floor.

4. Fewer core plates needed because their turnover is faster.

5. Special core runs can be made quickly. No delays.

Investigate THERMEX Electronic Baking Equipment today! Mail the coupon for free booklet. The Girdler Company, Thermex Division, Louisville 1, Kentucky.

*THERMEX—Trade Mark Reg. U. S. Pat. Off.

The GIRDLER Company

A DIVISION OF NATIONAL CYLINDER GAS COMPANY

THERMEX DIVISION

The Girdler Company, Thermex Division
224 East Broadway, Louisville 1, Kentucky

Please send me the new booklet on Electronic Core-Baking

Name .....

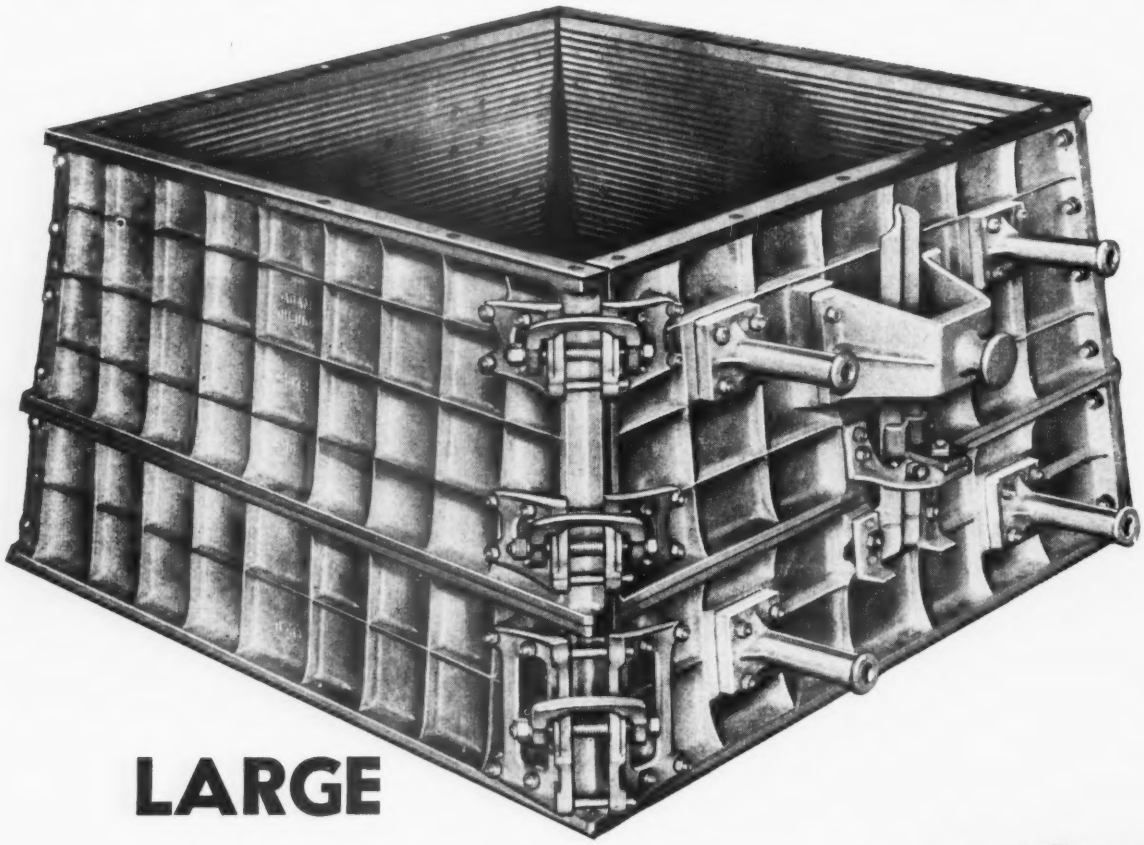
Position .....

Company .....

Address .....

City ..... *State* .....

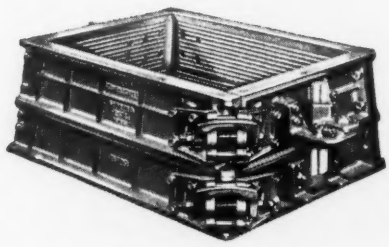
Adams Aluminum Easy Off Flasks



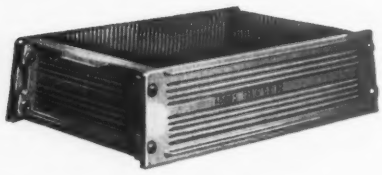
LARGE

USED WITH
ADAMS JACKETS
CAST IRON OR ALUMINUM

OR



SMALL



Assures you another winning combination from the most complete line of quality flask equipment.

Write us today for further information.

Let Adams help you analyze your flask equipment problems.

The ADAMS Company

ESTABLISHED 1883

MOLDING MACHINES and FLASK EQUIPMENT

700 FOSTER STREET, DUBUQUE, IOWA, U.S.A.

TIMKEN® bearings save mullor maintenance at ultra-modern foundry

THE 24 mullors at the Ford Motor Company's ultra-modern Cleveland Foundry operate automatically and continuously on a one-minute cycle. The assembly line set-up in this plant makes high dependability and low maintenance *extremely* important. Beardsley & Piper Speedmullors with Timken® tapered roller bearings at vital points meet these requirements.

The Speedmullor's roller shaft takes the main load of the mulling operation. Beardsley & Piper mounted it on Timken bearings. They have high load capacity because they have full *line contact* between rollers and races. Result: More dependable operation.

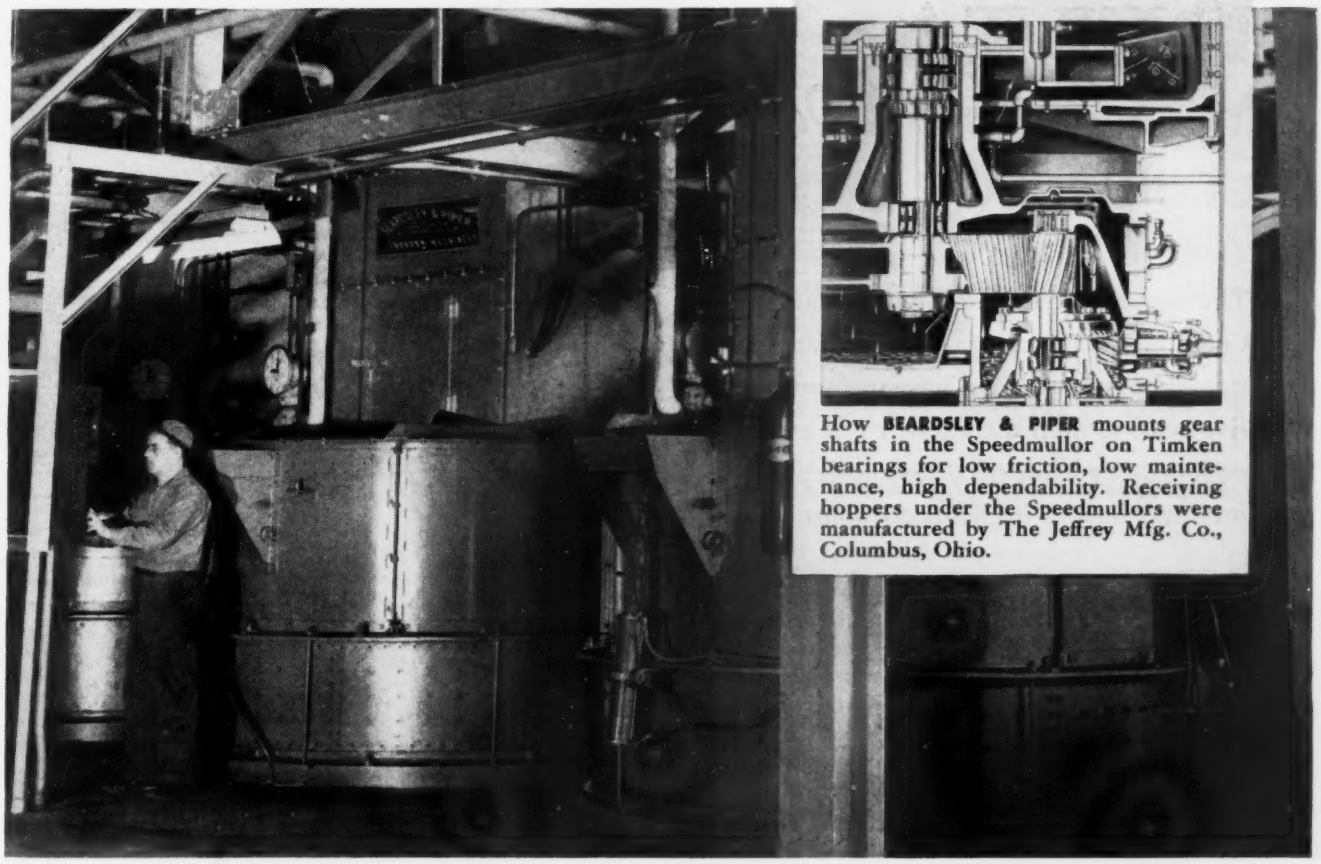
Timken bearings are made to microscopic tolerances so they keep the Speedmullor gear shafts in accurate alignment. This saves gear wear and forestalls the kind of trouble that could mean a costly shutdown.

The Speedmullor's drive shaft and bevel gear shaft are also mounted on Timken bearings. These bearings must take heavy thrust loads as well as radial loads. The taper enables Timken bearings to take any combination of radial and thrust loads and no extra thrust devices are required.

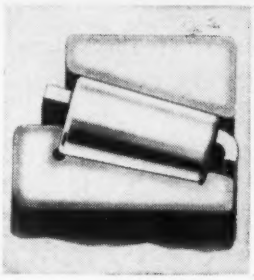
With all the sand and water around these mullors, good bearing closures are important. Timken bearings keep shafts concentric with housings which makes closures more effective.

Timken bearings are a sure sign of quality. When you buy or build machinery, always look for the trademark "Timken" stamped on the bearings. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



How **BEARDSLEY & PIPER** mounts gear shafts in the Speedmullor on Timken bearings for low friction, low maintenance, high dependability. Receiving hoppers under the Speedmullors were manufactured by The Jeffrey Mfg. Co., Columbus, Ohio.



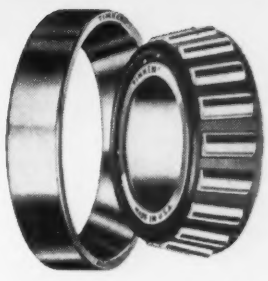
GREATER LOAD AREA

Because the load is carried on the *line* of contact between rollers and races, Timken bearings carry greater loads, hold shafts in line, wear longer. The Timken Roller Bearing Company is the acknowledged leader in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis Timken steels.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

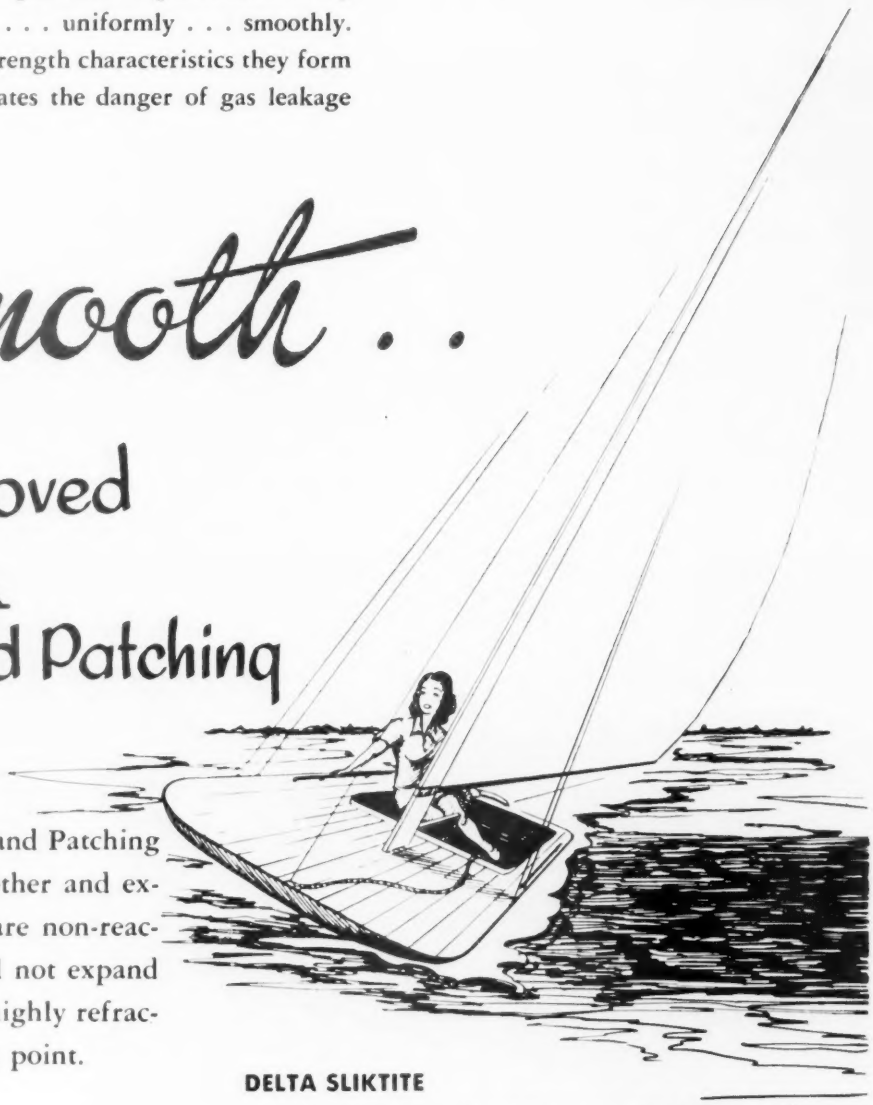


NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ▯ AND THRUST ⊣▯⊢ LOADS OR ANY COMBINATION

Delta Mudding and Patching Compounds are used to eliminate fins at core joints and to repair core imperfections. They are easy to apply . . . quickly . . . uniformly . . . smoothly. Due to their high hot and dry strength characteristics they form a complete bond which eliminates the danger of gas leakage at core joints.

Smooth . .

New...Improved DELTA Mudding and Patching Compounds



The new DELTA Mudding and Patching Compounds are faster, smoother and extremely easy to use. They are non-reactive with molten metal, will not expand or contract when dried, are highly refractory and have a high fusion point.

DELTA SLIKTITE

is a clean, smooth, ready to use plastic-type Mudding and Patching Compound for use on cores in the production of steel, gray iron, malleable and non-ferrous castings.

DELTA EBONY

is a smooth, black, ready to use plastic-type Mudding and Patching Compound for use on cores in the production of gray iron, malleable and non-ferrous castings.

Ask for working samples of the new, improved Delta Mudding and Patching Compounds. Be sure to specify SLIKTITE or EBONY. You will also receive complete instructions for use.

DELTA

DELTA OIL PRODUCTS CO.

MANUFACTURERS OF SCIENTIFICALLY CONTROLLED FOUNDRY PRODUCTS

MILWAUKEE 9, WISCONSIN

Placing lightweight shavings and chips near discharge end provides a cushion that protects the furnace lining from heavier scrap.

LINK-BELT Oscillating Conveyor proves highly effective charging induction furnace at New England foundry

BY installing a Link-Belt Oscillating Conveyor to charge their large capacity electric induction melting furnace, this New England non-ferrous foundry achieved two important advantages:

(1) An entire furnace batch (2½ tons) of brass mill scrap, chips and shavings can be loaded on the conveyor at one time—freeing the operator for other duties.

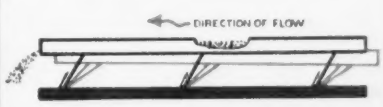
(2) Positive Action (see box) smooths concentrated loads to a uniform, continuous flow at the furnace.

Over a thousand Link-Belt Oscillating Conveyors are operating successfully in foundries. They find additional use separating sand and castings when the feed end section has a perforated plate bottom that acts as a shakeout.

Remember, too, you can now save time and money because 36 in. wide sections are carried in stock. These pre-engineered sections can be built up to any desired length.

Whether you need a single machine or a complete sand and castings handling system—call on Link-Belt. Our engineers will work with you and your consultants—help you get the finest in mechanized facilities.

How Positive Action moves materials



Positive-action, constant-stroke eccentric provides a powerful, yet gentle upward and forward oscillating motion. Large volumes of material are moved in a uniform, continuous flow, regardless of surges. Resonant spring action of resilient legs cuts power requirements to a minimum.

LINK-BELT

CONVEYORS AND PREPARATION EQUIPMENT

13.552

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Sydney; South Africa, Springs. Representatives Throughout the World.

Here's a New, Easy Way to ADD VANADIUM TO STEEL

NEW . . .

ELECTROMET ferrovanadium now comes packed in bags. This makes it easy to charge to the furnace or add to the ladle.

NO WEIGHING . . .

Each bag holds exactly 25 lb. of contained vanadium. Just count the bags. Weighing is not necessary.

EASY TO IDENTIFY . . .

Bags have wide blue bands for positive identification. Dirt is kept out and there is no chance of mixing with other alloys.

LOWER HANDLING COSTS . . .

You can get pallet shipments at no extra charge. Pallets are easy to handle by lift truck or crane — and they need not be returned.

HIGH-QUALITY ALLOYS . . .

ELECTROMET ferrovanadium is uniform in analysis, closely graded, correctly sized, and physically clean. There are four grades — high-speed, special, open-hearth, and foundry.

IMMEDIATE DELIVERY . . .

Write, wire, or phone for more information about how ELECTROMET'S bagged vanadium can cut your costs. Offices in principal steelmaking centers.

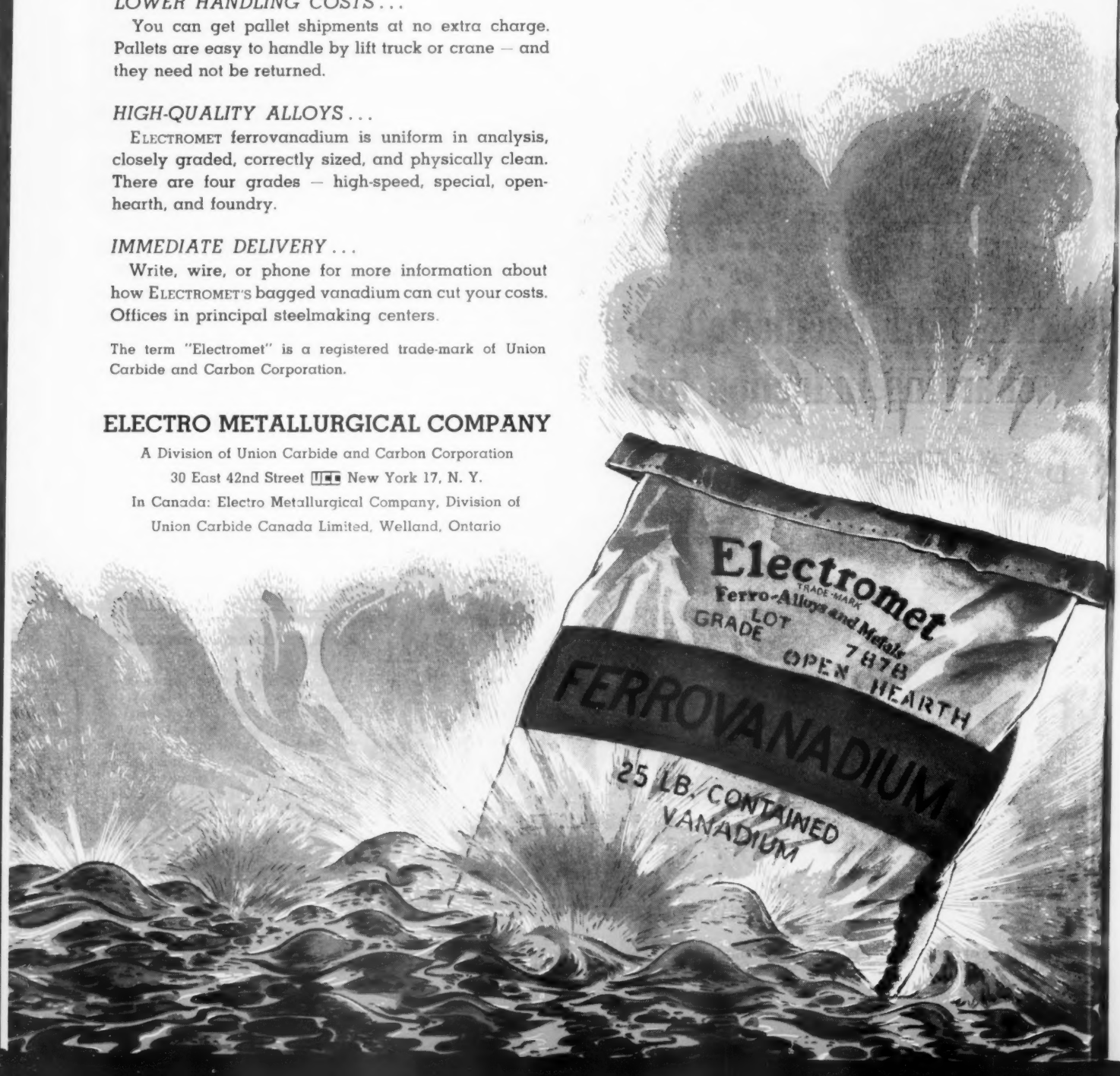
The term "Electromet" is a registered trade-mark of Union Carbide and Carbon Corporation.

ELECTRO METALLURGICAL COMPANY

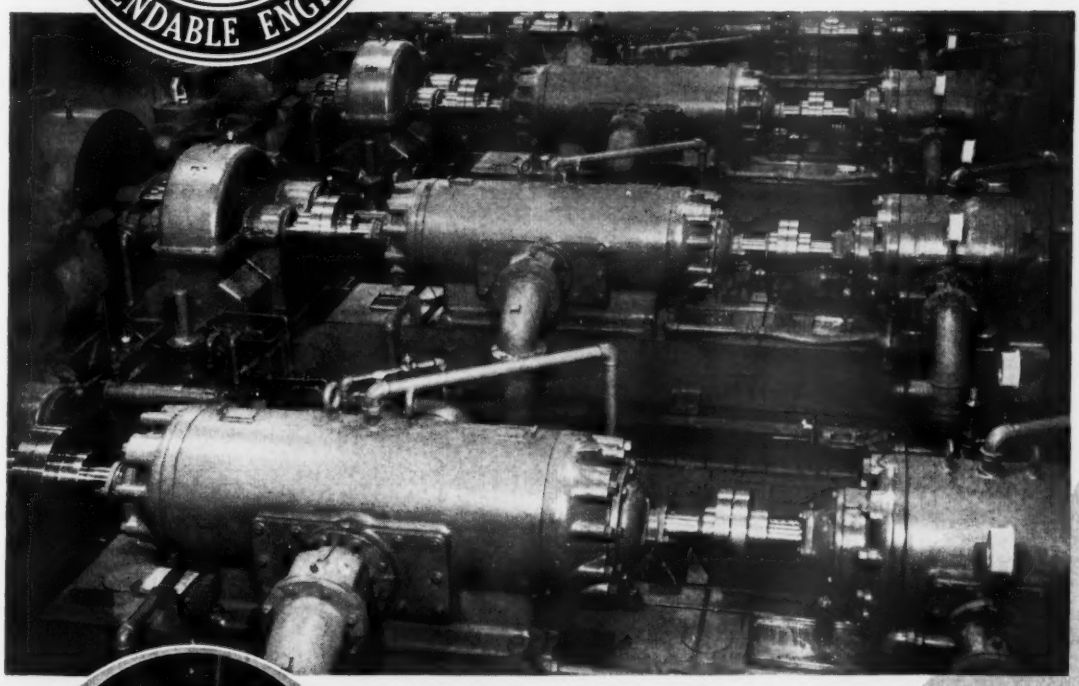
A Division of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York 17, N. Y.

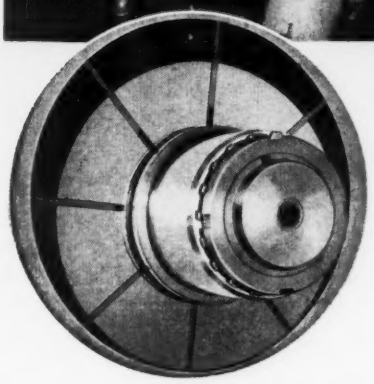
In Canada: Electro Metallurgical Company, Division of Union Carbide Canada Limited, Welland, Ontario



PRATT & WHITNEY AIRCRAFT



Four Fuller Rotary Compressors, Elliott steam-turbine driven, have a total capacity of 6760 c.f.m., at 110 p.s.i.



depends on FULLER AIRPOWER

Four Fuller Rotary Two-stage Compressors put Pratt & Whitney Aircraft's engine plant in East Hartford on a 100 p.s.i. air diet for such operations as shot peening, spray booths, air cleaning, and air-operated chucks.

Pratt & Whitney Aircraft has joined no *small* family of users; food and chemical plants, steel mills and cement mills, gas-gathering plants, refineries, automobile plants, foundries and machine shops, public utilities, and many others depend on Fuller for compressor equipment, wherever air is required.

Whether *your* air-plans call for single-stage, two-stage — single-stage duplex or two-stage duplex—you can be sure Fuller has the compressors which gives you a dependable source of pulsation-free air up to 3300 c.f.m., 125 p.s.i., with maintained capacity for the life of the machine.

Write for Bulletin C-6, Fuller Rotary Compressors.

FULLER COMPANY, Catasauqua, Pa.
Chicago 3—120 So. LaSalle St.
San Francisco 4—420 Chancery Bldg.

Fuller

PIONEERS OF HIGH-EFFICIENCY VANE-TYPE ROTARY COMPRESSORS

C-225
1624

● Fluidity spiral of gray iron deoxidized with FERROCARBO® is 40% longer than spiral yielded by untreated gray iron.

BETTER CASTINGS start with more fluid iron...

And iron deoxidized with FERROCARBO® patented Briquettes *is more fluid* at casting temperatures than untreated iron. You can prove this in a ten day test in your cupola. Longer runs are evident from the first day you add FERROCARBO to the charge. After eight to ten days, when the sprues and returns are saturated, the spiral fluidity molds will show ***considerably longer*** runs.

Another advantage is a substantial reduction in misruns—especially in castings with complicated molds and thin sections. You will get increased silicon recovery, too; and you can charge more scrap—steel or cast iron—because FERROCARBO reduces the chilling tendency.

The man who uses your castings will find them finer-grained, denser, stronger... much easier to machine (and easier on his tools) because they contain fewer segregations, chilled or hard spots.

MAKE YOUR OWN TEST. Call your FERROCARBO Distributor today. Or write for the free booklet, "Producing Superior Gray Iron Castings." Address: The Carborundum Company, Dept. F 84-43, Niagara Falls, N.Y.

FERROCARBO DISTRIBUTORS:

KERCHNER, MARSHALL & CO.
PITTSBURGH • Cleveland • Buffalo
Philadelphia • Birmingham • Los Angeles

MILLER & COMPANY
CHICAGO • St. Louis • Cincinnati

WILLIAMS & WILSON
TORONTO • Montreal • Windsor

● *In Canada, "Carborundum" and "Ferrocarbo" are registered trademarks of Canadian Carborundum Company, Ltd., Niagara Falls, Ontario*

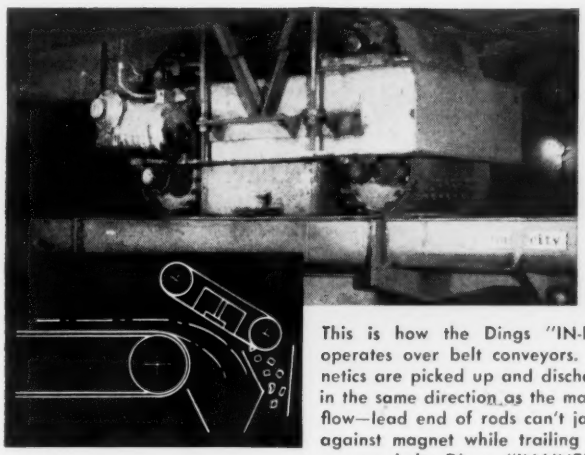
FERROCARBO by CARBORUNDUM

REGISTERED TRADE MARK

REGISTERED TRADE MARK

84-43

. . . Could have been saved by a DINGS "IN-LINE" MAGNET



This is how the Dings "IN-LINE" operates over belt conveyors. Magnetics are picked up and discharged in the same direction as the material flow—lead end of rods can't jam up against magnet while trailing edge gouges belt. Dings "IN-LINE" RM Magnet is widely used over vibrating pan conveyors.

RIPPED, destroyed conveyor belts are the usual result of trying to separate long iron rods from belt burdens with ordinary suspended tramp iron magnets.

Dings new "IN-LINE" Suspended Self-Cleaning Magnet eliminates this risk. Its self cleaning belt moves in the same direction as the conveyor over which it is suspended. The "IN-LINE" picks up and discharges tramp iron in the direction of material flow.

You can see the difference this makes — the leading end of a rod can't jam up against the magnet face while the trailing end digs into and rips the belt.

The "IN-LINE" is a self-cleaning version of the Dings RM rectangular magnet—the most efficient ever designed for removing tramp iron from conveyor belt burdens. Available in standard sizes to meet almost any belt speed, width or burden characteristic requirements. Write today for a copy of the new Dings RM Catalog, 1315-A. A note on your letterhead will do.

. . . the most complete line of electric and non-electric, permanent, Alnico Magnets and Magnetic Separators is available from Dings for the protection of your processing equipment and product. Learn about the application of magnets in industry . . . send for a copy of Catalog C-5000-B.

Dings

DINGS MAGNETIC SEPARATOR COMPANY

4708 West Electric Avenue • Milwaukee 46, Wisconsin

Meet the "expert" who

Core Handling Cores by the thousand—special racks holding from 10 to 100, depending on size—are moved from core-making to molding lines by 6000-lb. Clark truck.

Servicing Trim and Sprue Line

Castings shaken from the molds are sprued, trimmed, and inspected, then loaded in tote boxes and taken to temporary storage by Clark truck. Boxes are stacked 4-high. Loads range from 1500 to 4500 pounds.

Charging the Annealing Furnaces

Castings from temporary storage are packed in alloy containers on roller trays and placed by Clark truck on the receiving stand of an annealing furnace.

revolutionized handling methods at Albion Malleable

Discharging the Annealing Furnaces When discharged from an annealing furnace, casting containers are emptied into self-dumping hoppers by a Clark, and transported to cleaning where they are magnet charged into shot mills. The truck is equipped with a 360° rotating device and 42" adjustable forks.

Finished Castings Put in Shipping Storage Bins Cleaned, sheared or milled and pressed to true alignment, castings are taken by Clark truck in self-dumping hoppers and deposited in designated shipping storage bins. Space beneath the bins is utilized for press die storage.

Loading for Shipment Castings scheduled for shipping are taken from storage bins into self-dumping hoppers on Clark trucks—weighed, then dumped directly into semi-trailers.

Placing New Die Setting a die in a hydraulic press—formerly a hazardous, back-breaking job—is a trifling task for the husky Clark. Clarks also handle a variety of maintenance jobs as well as the undertaking of special tasks in operations such as melting and molding.

"Thorough integration is necessary for economical plant operation —Clark trucks help make it possible."

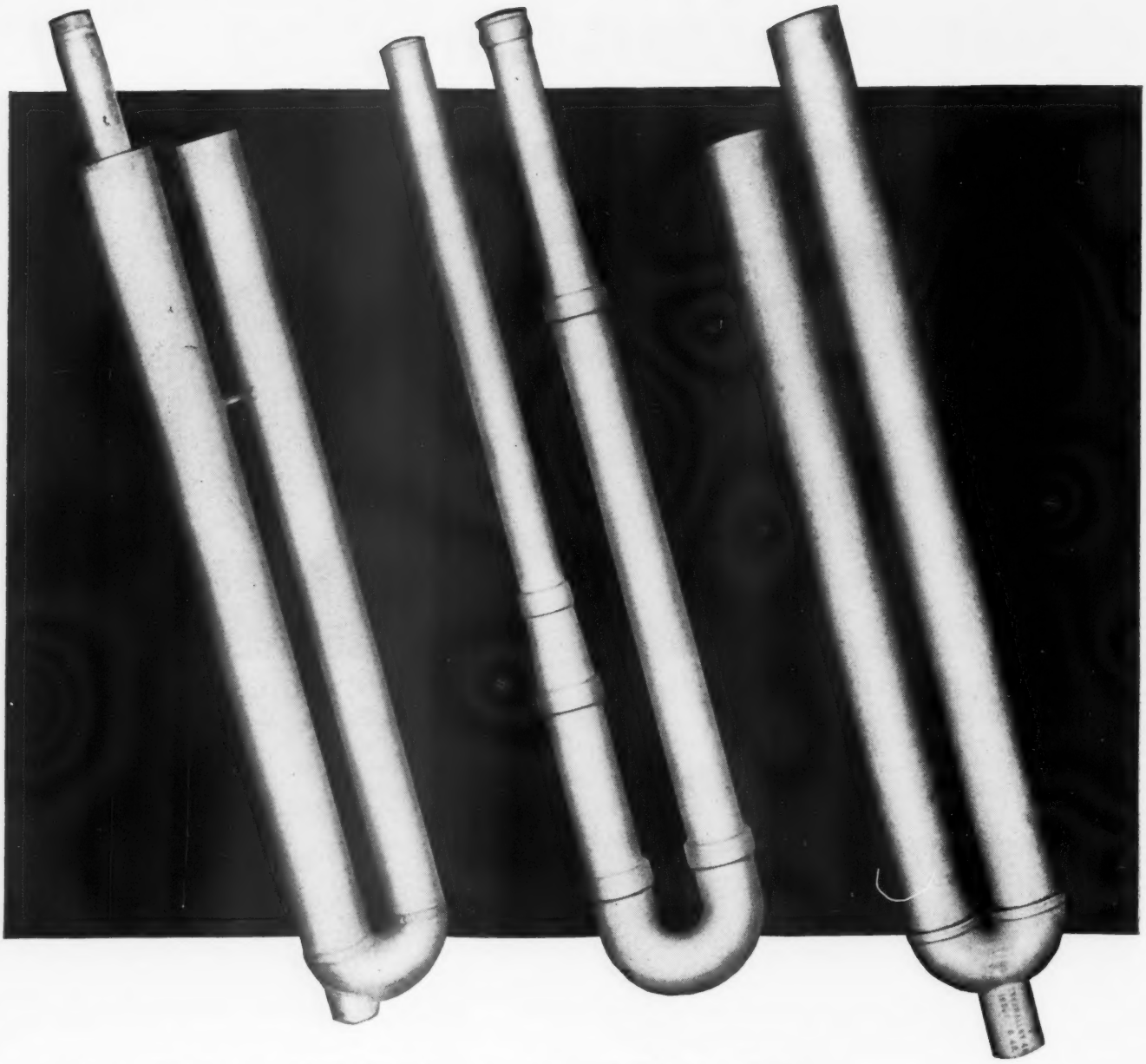
T. T. Lloyd, Manufacturing Manager
Albion Malleable Iron Company, Albion, Mich.

"Frankly, we couldn't operate this plant economically without fork trucks—they give us versatility, flexibility of movement and tight control essential to integration of our production... Our Clark 6000-lb. trucks—three gas powered, one electric Ready Power—have helped us immeasurably in modernizing our methods and eliminating unnecessary hand labor."

Your local Clark dealer, listed in the Yellow Pages under "Trucks, Industrial," can help you achieve the same sort of low-cost integration. Call him—there's no obligation.

CLARK® EQUIPMENT

Industrial Truck Division
CLARK EQUIPMENT COMPANY
Battle Creek 16, Michigan



GET MORE HOURS OF SERVICE FROM

Thermalloy* radiant tubes

Make Electro-Alloys your source if you want radiant tube assemblies that will give more life and reduce maintenance costs.

All components are produced in suitable analyses under close metallurgical supervision, and with X-ray control. The straight tube sections are centrifugally cast in such a way that wall thickness is uniform throughout; i. e., inside diameter and outside diameter are concentric, and thickness is the same the full length of the tube. All finished assemblies are pressure-tested before shipment to insure freedom from leakage. As a result, you are assured of radiant tube assemblies that last longer without cracking, warping or sagging.

Whatever your needs in radiant tube assemblies or other heat-treating equipment—you'll get more operating economy from high heat-resistant Thermalloy castings. Let us know your requirements. Call your nearest Electro-Alloys engineer or write Electro-Alloys Division, 5008 Taylor Street, Elyria, Ohio.

AMERICAN Brake Shoe COMPANY

ELECTRO-ALLOYS DIVISION

ELYRIA, OHIO

*Reg. U. S. Pat. Off

fine FANNER CHILL COILS

YOUR BEST DEFENSE *against unsound castings*

● Castings with different size sections need "relief from the heat" in the larger sections to equalize cooling rate throughout—to prevent sponginess, checks and cracks due to uneven shrinkage.

Fine Fanner Chill Coils, because of their wide range of sizes, shapes and metals, enable you to solve cooling problems where large masses of metal are not involved . . . prevent rejects and get sounder castings than ever before. Illustrated are a few fine Fanner Chill Coils used by leading foundries. Gauges, diameters, coil and tail length can be varied to suit any job.

wrong

Showing how metal has kicked away from ordinary nail head used in light casting section.

right

Showing a perfectly solid casting with fine Fanner Chill Coils.

Write for complete catalog of fine Fanner Chills today.

THE FANNER MANUFACTURING COMPANY

designers and manufacturers of FINE FANNER CHAPLETS AND CHILLS

BROOKSIDE PARK CLEVELAND 5, OHIO

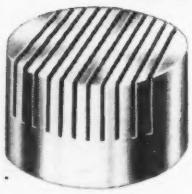
In Canada: CANADIAN FANNER, LTD. • Hamilton, Ontario

MANUFACTURERS OF PRECISION MACHINED-GROUND PARTS TOOLS · GAGES · FIXTURES

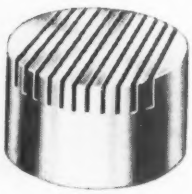
nothing takes the place of PRECISION and PERFORMANCE

CORE BOX VENTS
"A Specific Type for Every Core Box"

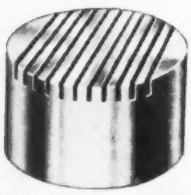
Slotted



X-TRA DEEP HEAD .156 Wide Slots .014

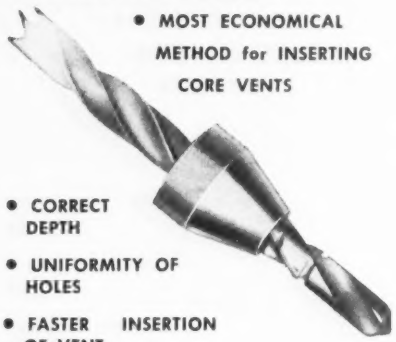


DEEP HEAD .093 Wide or Narrow Slots .014 .010



SHALLOW HEAD .031 Wide or Narrow Slots .014 .010

INSERTING DRILL



- MOST ECONOMICAL METHOD for INSERTING CORE VENTS
- CORRECT DEPTH
- UNIFORMITY OF HOLES
- FASTER INSERTION OF VENT

VENT CLEANER

- FOR CLEANING SLOTS
- MADE OF TEMPERED STEEL
- EASY TO USE

C.M. SMILLIE & CO.
1124 WOODWARD HGTS., FERNDALE 20, MICH

READERS' COMMENT

Training Indian Foundrymen

TO THE EDITORS:

I was just going through the May issue of Foundry and in reading your editorial, my mind went back several years to 1945, I believe. At that time Mr. Schnur was in China serving on the Donald Nelson Mission and I wrote in regard to his failure to receive his copies of FOUNDRY. You wrote me such a nice note that I've always felt I somehow knew you personally. I thought perhaps you might be interested in learning what we are now doing.

For the past two years we traveled the length and breadth of India via trains (which leave much to be desired) jeep, rickshaw, tonga and bullock cart. Mr. Schnur was sent on this assignment by the Armour Research Foundation of Illinois Institute of Technology. He did spot consulting, lecturing and gave physical demonstrations on foundry practice in over a hundred foundries. If anyone knows the ills of the Indian foundries, he surely does.

We returned to India this February at the specific request of the government of India and the Institute of Indian Foundrymen to establish a Training Center at the Indian Institute of Technology of Kharagpur, India, for the practical training of Indian foundrymen. The first class of 22 men from all over India will finish their three months' training the last of June, and there have already been more than enough applications filed for the remaining classes. Mr. Schnur and the Indians promoting this program feel this Training Center will be the means of reaching and helping the greatest number of foundrymen.

What I started to say before I got off on this subject that I'm so very interested in, is that all the two years that we traveled, and of course now that we are settled, we have never missed an issue of FOUNDRY. The Armour Research Foundation has always sent them to us; sometimes due to difficulties in reaching us they were delayed, but always deeply appreciated. We read them, then run a lending library for Mr. Schnur's students so they are very well read.

We have gone through our extremely hot season and are now entering the monsoon season which really brings India to life. Where the ground was sear and brown, now it is lovely and green.

By the way, sometime ago in one of the popular weekly magazines I read an article called, "I Rode Uncle Sam's Gravy Train." I wish to tell you that this is one family that is riding Uncle Sam's work train and there are quite a few Americans that I have met over here that are on the same train.

MRS. JOHN F. SCHNUR
I.I.T. Bung. A-4
Kharagpur, India

Spot Test Identification

TO THE EDITORS:

We were interested in a question appearing in the "Questions and Answers" section, page 132 of the November 1953 issue of FOUNDRY. The specific question was under the heading "Spot Test Identification" concerning a possibility of distinguishing between manganese bronze and aluminum alloys.

For the past year and a half the Magnaflux Corp. has been marketing the Magnatest FM-100 Conductivity Meter—a device for measuring the electrical conductivity of nonferrous materials. The readings are obtained by merely placing a small hand-held probe on the surface of the test piece, turning the large dial and reading the value directly from this dial. The readings are relatively independent of size or shape of the part. No electrical contact is necessary to obtain a measurement.

The values of electrical conductivity for manganese bronze and aluminum bronze in both the cast and wrought form are given below*:

Cast manganese bronze	12 to 18
Cast aluminum bronze	13 to 14
Wrought manganese bronze	24
Wrought aluminum bronze	12 to 17

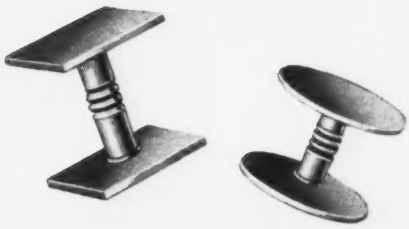
*Per cent, international annealed copper standard.

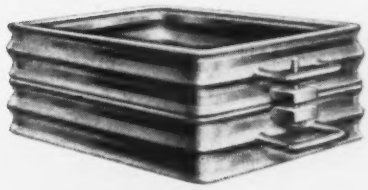
Since the values of electrical conductivity for cast manganese bronze and aluminum bronze overlap, this method could not be used to distinguish accurately between these two alloys. However, if both were in the wrought condition, this method could be a fast, accurate and simple means of determining one from the other.

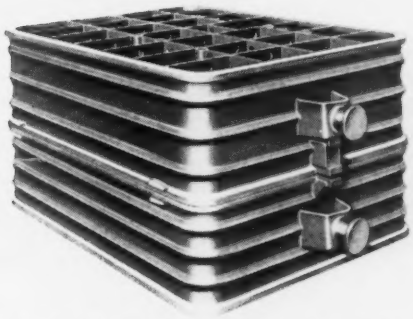
If there is any further information you feel necessary we would be more than happy to submit it to you.

W. A. CANNON JR.
Engineer
Magnaflux Corp.
7300 W. Lawrence Ave.
Chicago 31

Over 60 Years of Dependable Service to the Foundry Industry







We're looking forward—not backward. Today, in a new plant, with modern manufacturing facilities, The Shanafelt Co. is building the finest steel flask in its many, many years of building this dependable product. And there are new improvements ahead.

It is a great satisfaction to realize that we're here today because foundrymen have found our products good, our prices sensible, and our promises dependable. Let us assure all our friends that, while we'll always change and improve our products, we'll never change the fundamental policies that have given us these 60 successful business years.

THE SHANAFELT MANUFACTURING CO.

2600 - 2700 Winfield Way N. E., Canton, Ohio

Economy-minded foundrymen requiring foundry flasks invariably specify STERLINGS. Why? Because they know, when they buy the best, they're bound to get a bargain! STERLINGS last longer . . . *much longer than ordinary flasks* . . . because they are fabricated from special hot rolled steel channel having a tensile strength of 70,000 lbs. They can take hard punishment, day after day, for years. That's why Sterlings actually cost less.

Get all the facts! Write today for your copy of Sterling Flask Catalog.

Sterling

WORLD WIDE SERVICE

STERLING WHEELBARROW CO.
Main Office and Plant • Milwaukee 14, Wis., U. S. A.
Branches and Dealers in Principal Cities

Subsidiary Company
STERLING FOUNDRY SPECIALTIES, LTD.
London, Bedford and Jarrow-On-Tyne, England

Manufacturers of Foundry Equipment for Almost Half a Century

A 7711-1PC

Let's Talk Castings!

A new idea in the promotion of an industry was introduced recently when the Committee of Railroad Suppliers undertook an ambitious program of telling the American public of the accomplishments, importance and problems of the nation's railroads.

To start the campaign, the committee staged a press luncheon in New York, with 250 present. Those from the press included feature writers and editorial representatives of business publications, news wire services, newspapers, magazines, radio and television. Also present were top railroad executives and representatives of the 22 companies who make up the committee. It is interesting to note that 18 of these companies operate foundries.

To brief the press, Benjamin F. Fairless, chairman, United States Steel Corp., presented impressive facts and figures on the accomplishments of the railroads in both peace and war, but pointed out that today 13,000 steelworkers are out of jobs because railroads cannot buy equipment that they should buy and would buy if they could afford to do so. Analyzing the problem of that industry, he stated that American railroads are being taxed to death, bargained to death and regulated to death. For a healthy economy, the freedom to compete should not be denied any American enterprise.

On the day following the luncheon, full-page advertisements sponsored by the committee appeared in newspapers across the country. Headed "There's a lesson for businessmen in that old familiar station," the text tells of the railroads' modernization and rebuilding program and the problems developed by rigid government regulations. A booklet, "A Look Beyond the Station," is being distributed to 50,000 business men.

Judging from the success of the initial effort, the program has possibilities for tremendous service to the railroad industry.

Is it possible that suppliers to foundries also might do more to promote the greater use of castings throughout the metalworking industry?

If all those connected with companies supplying the industry were to become more familiar with the advantages, properties and range of applications of castings, and would talk about them wherever metallic components are used, foundries should benefit through some improvement in sales. As a corollary, foundries would be in a position to buy more materials and machines.

The first step in such a program became apparent from comments of foundrymen following the recent Foundry Show. While numerous equipment producers have utilized castings wherever possible, many are using parts produced by other methods. Part of the responsibility may rest with a lack of an aggressive sales effort on the part of foundrymen, a condition which is improving rapidly.

Nevertheless, the fact remains that promotion of the use of castings by those supplying foundries would appear to be a must.

Frank G. Steinebach

Editor

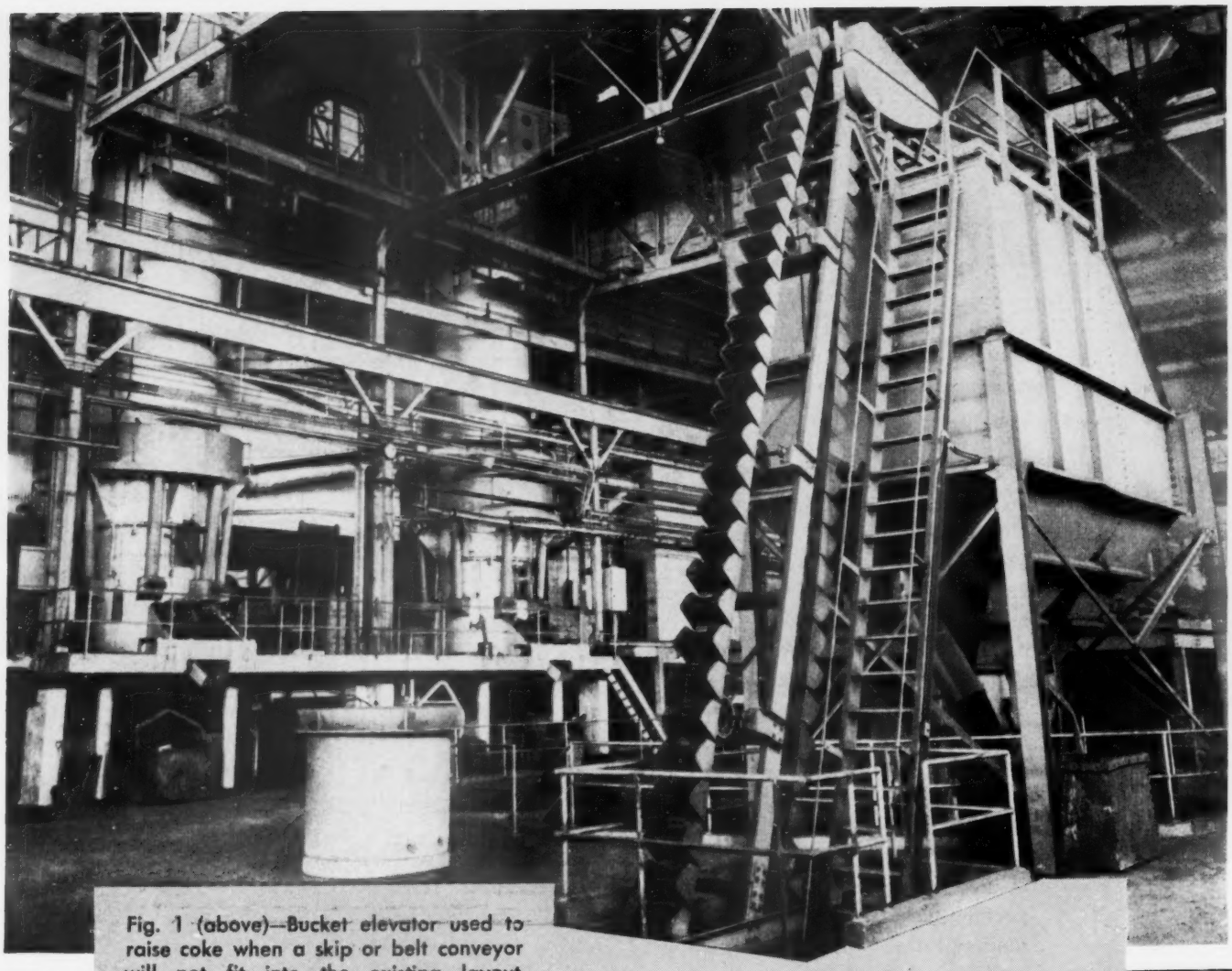


Fig. 1 (above)—Bucket elevator used to raise coke when a skip or belt conveyor will not fit into the existing layout

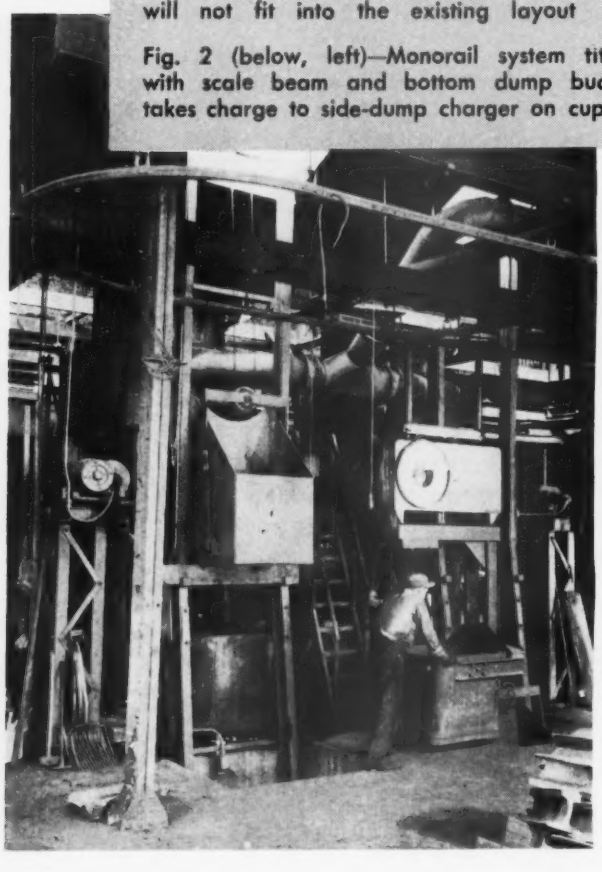


Fig. 2 (below, left)—Monorail system fitted with scale beam and bottom dump bucket takes charge to side-dump charger on cupola

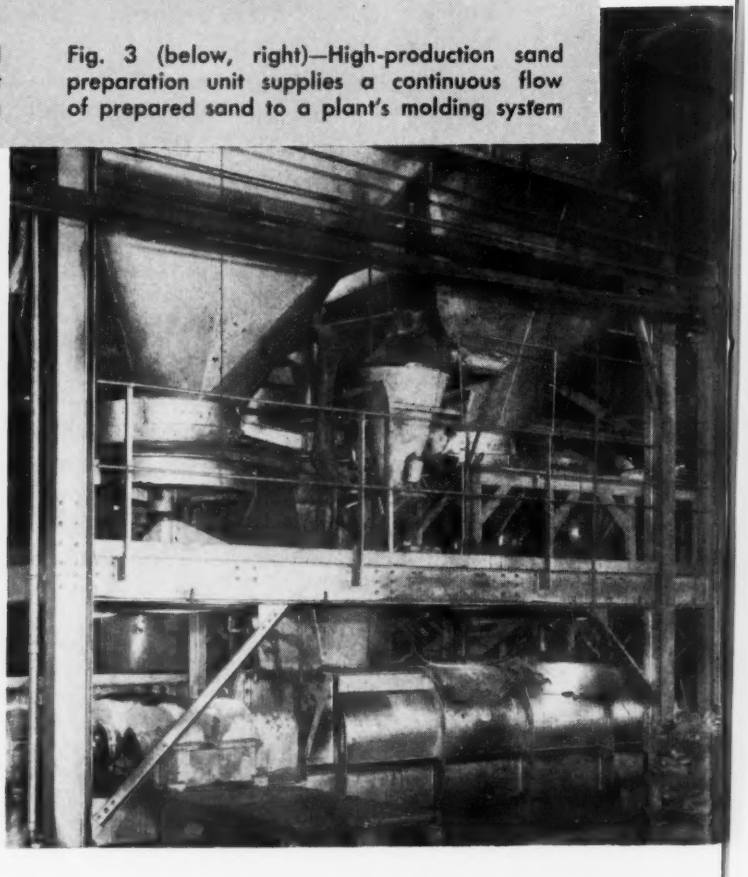


Fig. 3 (below, right)—High-production sand preparation unit supplies a continuous flow of prepared sand to a plant's molding system

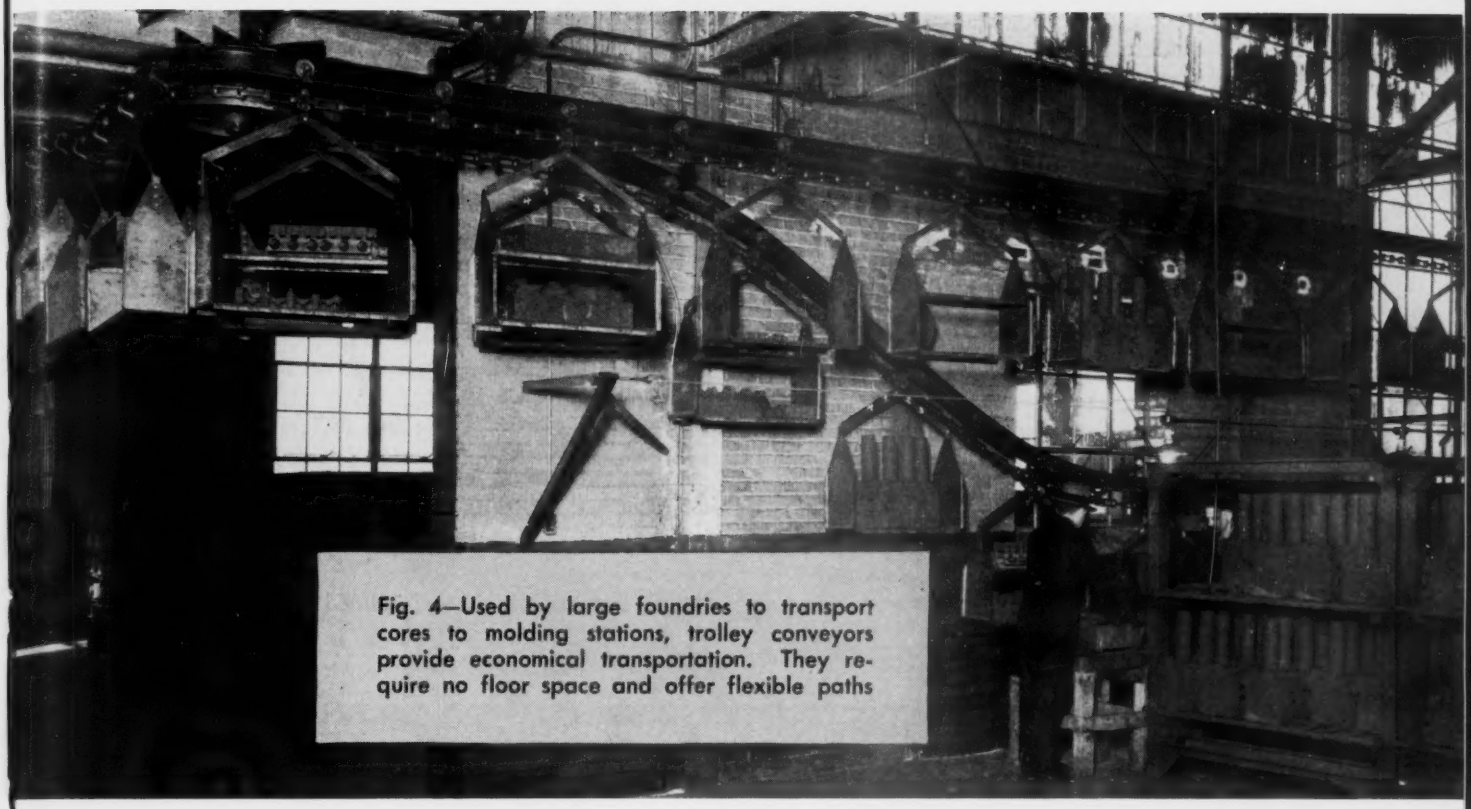


Fig. 4—Used by large foundries to transport cores to molding stations, trolley conveyors provide economical transportation. They require no floor space and offer flexible paths

Developments in

FOUNDRY MECHANIZATION

By R. J. GEITMAN
Sales Engineer
Link-Belt Co., Chicago

MATERIALS handling is of prime importance in a modern foundry, for approximately 40 to 50 per cent of the total labor expended is required to handle bulk material. This figure applies to small as well as to large foundry installations. It is estimated that approximately 150 to 200 tons of material must be handled to produce 1 ton of good castings.

With a more competitive market forecast in the future, it is essential to review all foundry operations to determine the most economical ways to perform them. Mechanization frequently points the way. Increased production, lower unit cost and improved working conditions are the primary purposes of mechanization. New developments in foundry practice such as shell molding, the D-process, pressure molding, investment molding and automatic molding have opened new fields for ingenious design of materials handling equipment.

It is essential to conserve and to make the most efficient use of labor by augmenting its efforts with mechanical devices, when practical, in order to create more efficient operation. When materials handling operations are performed manually, they usually are hot, dirty, dusty and hazardous and involve plenty of lifting, shoveling and other forms of drudgery. Improvement of such conditions not only is good economics, but also will attract more competent workers to the foundry industry.

The real problems of mechanization appear when we consider the extent to which any individual foundry can mechanize profitably and consider the variables which govern such consideration. Probably no two foundries are exactly alike in their building layouts, operating methods and management. All of these factors influence the selection and arrangement of equipment as well as the tonnage handled and class of work produced. Each plant requires individual study and analysis.

Flexibility is of utmost importance in mechanization. Due consideration also must be given to economical operation when the foundry is functioning at half capacity, as well as at full capacity or over it. Regardless of size, foundries planning to mechanize should start with a carefully considered over-all plan, even though the economics of complete mechanization cannot be foreseen immediately. Thus, units may be installed step-by-step, always following the over-all plan and allowing for readjustment and careful selection of work to be placed on the mold and sand handling systems as the organization develops experience in their usefulness. Often it is better to take this step-by-step approach even though the economics of complete mechanization are indicated in the beginning.

There are several fundamental steps to consider in formulating a materials handling system in any foundry. They are these:

1. Analyze accurately the capacities required to meet the sales potential.

Fig. 5—Molders should be relieved of all duties except making molds and should be provided with overhead sand supply and the proper type of molding machine. The modern, mechanized foundry shown here uses continuous car-type conveyors to transport molds through pouring, cooling and shakeout

2. Make a careful study of present equipment and building facilities if the foundry already exists.

3. Attempt to obtain straightline flow in the production processes from the entrance of raw materials in the plant to finished castings leaving the shipping room. The advantages of this flow are apparent when one observes some of the commercial plants that have "grown like Topsy."

4. Develop a flow sheet layout for study and discussion with the foundry personnel including foundry superintendents, foundry engineers and the entire top administrative staff.

5. After a desirable flow has been finally established, develop a more detailed layout. In developing this layout, study each department separately, making large scale layouts involving equipment and operations essential to that department. These separate layouts then can be integrated into the final layout.

Now let us consider some of the materials handling operations in the foundry and the various methods which can be employed for that purpose.

Raw Materials—Raw material handling in the material yard should be arranged for unloading by a monorail conveyor or yard crane to storage bins, depending upon the size of operations and the physical limitations of the yard facilities. An electromagnet generally is used in conjunction with an overhead yard crane spanning the entire unloading area. Transfer of material for making up the charge is accomplished with similar units. Fig. 2 illustrates a monorail system fitted with scale beam and bottom dump bucket for transporting the charge to the side-dump charger on a cupola.

In a large production foundry, the unloading and charge makeup system is more elaborate and might include a charge makeup unit, consisting of bins for coke and limestone. The charging bucket is transferred on a car underneath the bins and is arranged with a scale for making up the charge from the various bins.

Slag handling can be simplified by an hydraulic slag disposal system and will produce a usable by-product. This equipment cleans up the melting department and relieves the cupola tender and charging crew of hot and disagreeable work.

One of the major considerations in handling coke in the foundry is to keep the breakage at a minimum. Wherever possible, and where quantities are sufficient, probably the best method yet developed for unloading foundry coke to storage is by an automatic skip hoist receiving the coke from bottom dump hoppers and very gently elevating the coke to a belt conveyor that will deliver the coke to storage bins.

In some instances elevators are used to elevate coke, as illustrated in Fig. 1. An elevator usually is used when a skip or belt conveyor will not fit into the existing layout. The coke is fed to the elevator by a belt conveyor that feeds a uniform quantity of coke from a track hopper, and in handling coke the slow-moving, continuous-type bucket elevator is used to eliminate degradation of mate-

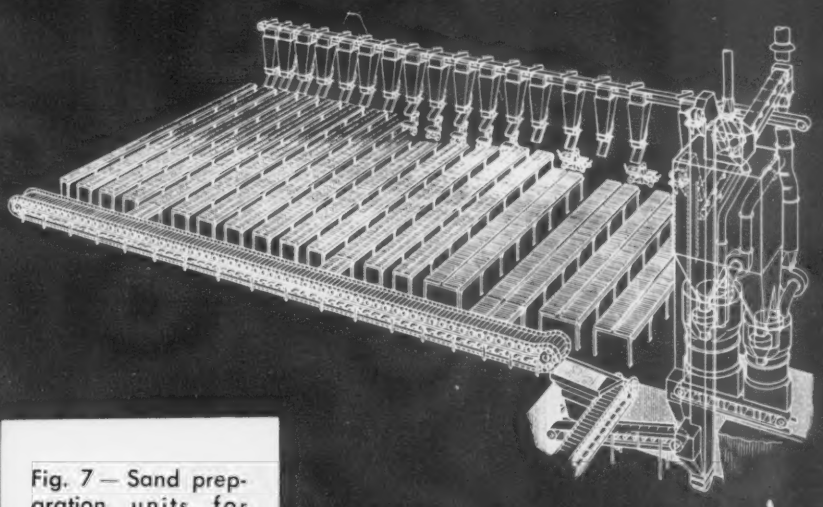


Fig. 6—This illustration depicts the flow of molding sand through a typical mechanized foundry, from shakeout hopper to molding station. The sand constitutes the greatest bulk of material handled during the molding cycle

Fig. 7 — Sand preparation units for the small foundry follow the pattern illustrated in this view. If a step-by-step expansion program is planned, this highly flexible unit might be considered as the original installation. It can be expanded if necessary

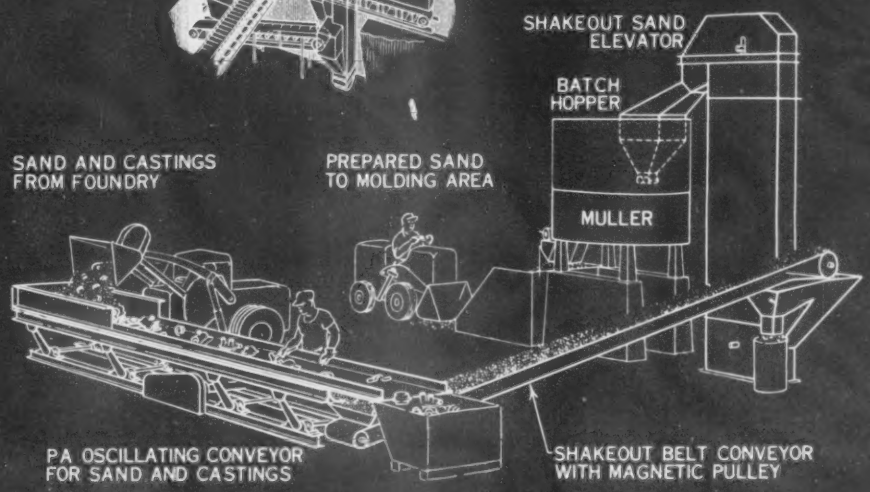
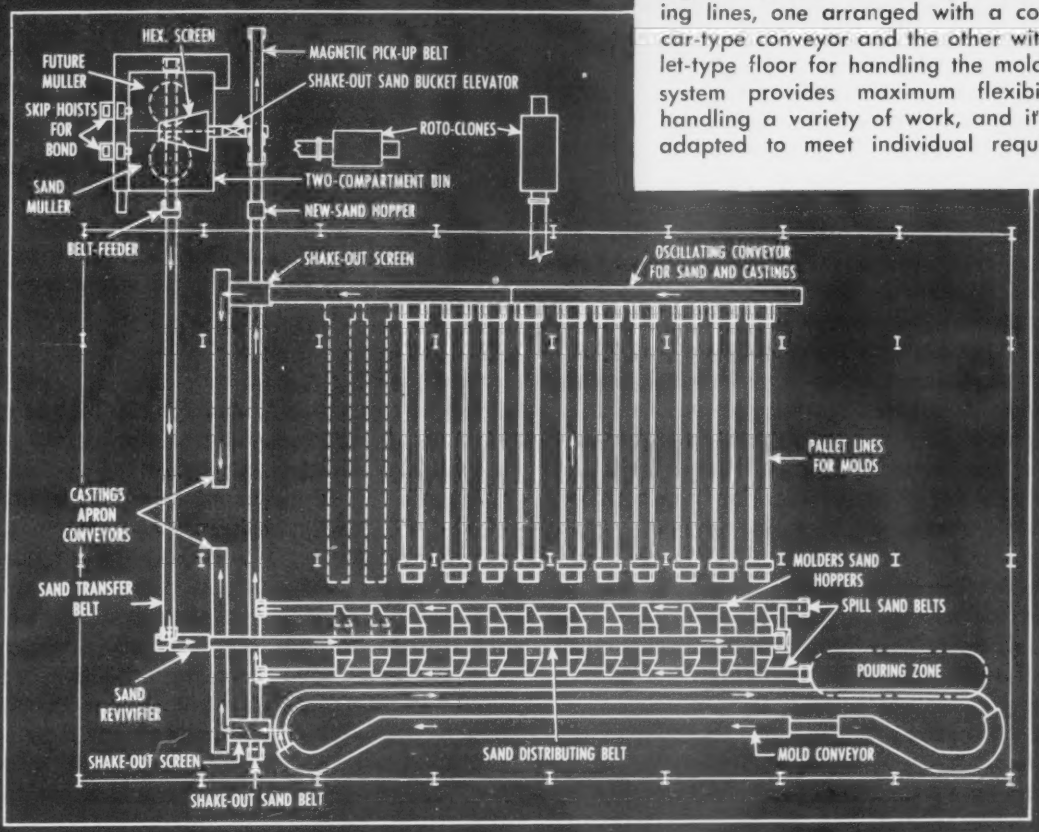

SHAKEOUT SAND ELEVATOR
BATCH HOPPER
MULLER
SAND AND CASTINGS FROM FOUNDRY
PREPARED SAND TO MOLDING AREA
PA OSCILLATING CONVEYOR FOR SAND AND CASTINGS
SHAKEOUT BELT CONVEYOR WITH MAGNETIC PULLEY

Fig. 8—Mechanized foundry has two molding lines, one arranged with a continuous car-type conveyor and the other with a pallet-type floor for handling the molds. This system provides maximum flexibility for handling a variety of work, and it can be adapted to meet individual requirements



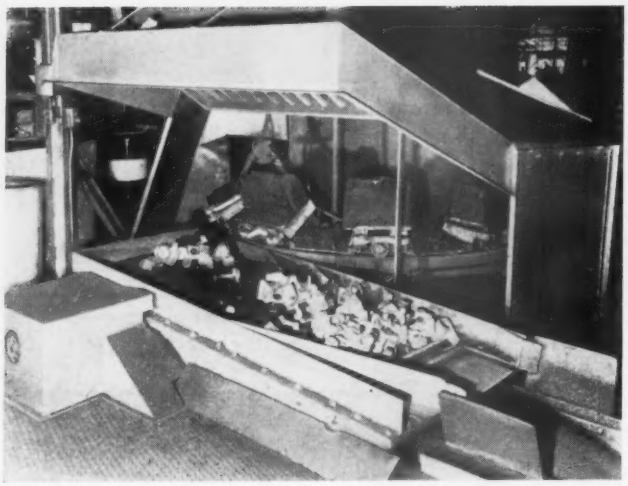


Fig. 9—Mold shears off bottom board and discharges to a shakeout screen where the castings are separated from the sand and then discharged

Fig. 10—The pouring zone of two mold conveyor lines in a high production mechanized foundry is screened off from the remainder of the plant

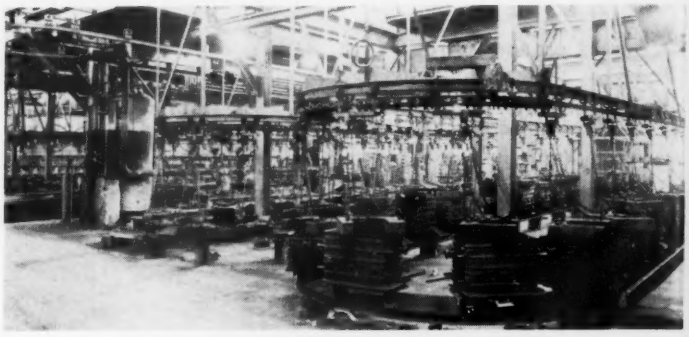


Fig. 11—Overhead trolley weight conveyor synchronized with mold conveyor further eliminates manual handling of weights or clamping of molds

Fig. 12—In this view of the spruing and picking section of a heavy-duty casting apron conveyor, castings are put in the containers shown

rial as much as possible.

The coke discharges over a bar grizzly for removal of breeze at the top of the bin. The bin may be of the two-compartment type, with one compartment for coke and the other for limestone, which is loaded in the bin by a clamshell bucket operated from an overhead crane.

Coreroom—In the majority of foundries, considerably more attention has been given to the actual molding operation than to the core and finishing departments. This attention is only natural since the molding operations represent a larger potential for saving indirect labor. However, coreroom and finishing room operations consume a great amount of indirect labor in handling and rehandling of materials. They warrant careful study to eliminate bottlenecks and back-tracking.

Selecting the proper type of core oven represents a major problem in any coreroom. Most foundries, particularly those making diversified types of castings requiring both large and small cores, will find that a batch-type oven is very practical and offers considerable flexibility. A foundry may want to use a continuous-type oven in addition to a batch-type oven. The continuous-type oven certainly offers many advantages from a materials handling standpoint because cores can be conveyed from the coremaker to the oven in a straightline flow, and baked cores can be taken from the core oven at the opposite side. All of these operations are continuous, not intermittent, as they are with the batch oven.

Large foundries utilize trolley conveyors, Fig. 4, to transport cores to the molding stations; this type of conveying medium provides economical transportation because of its flexibility of path. No floor space is required since it is suspended from overhead. The small foundry trucks cores to the molding stations in core carts or lift trucks. Sand distribution by drop-bottom buckets traveling on an overhead monorail and discharging into the coremakers' hoppers is another worthwhile materials handling operation.

Sand Preparation—Sand constitutes the greatest amount of material handled during the molding operation. Consider the flow of molding sand through a typical mechanized foundry as illustrated in Fig. 6. Sand is fed from the shakeout hopper at a uniform rate by a belt feeder equipped with a magnetic pulley. After magnetic separation of the tramp iron, the sand is elevated by a bucket elevator discharging to a sand screen located above the shakeout sand storage bin. Screened sand falls into this bin and is withdrawn from the bottom by gates to batch hoppers, for measurement. It then enters the muller for conditioning for molding. In most cases, prepared sand is cooled during the mulling cycle.

Prepared and cooled sand is discharged from the

Fig. 13—View shows transfer point between cleaning room and shipping room trolley conveyor of type that can tie together widely separated departments

muller to a hopper large enough to take the muller's capacity. The sand is fed from this hopper by a belt feeder to a bucket elevator, which discharges the sand to a revivifier. The revivifier imparts flowability to the sand and discharges it onto a distributing belt conveyor in an aerated condition. Sand is plowed from the distributing belt conveyor to the molders' hoppers.

Sand preparation units for the small foundry have been standardized in one instance as illustrated in Fig. 7. Sand and castings are dumped by tractor shovel into the oscillating conveyor, which is arranged with a double deck trough for removal of sand from castings. The top deck of the oscillator acts as a shakeout, and the discharge end provides ample room for spruing and sorting. The bottom deck conveys the sand to a magnetic belt conveyor for removal of tramp metal.

The elevator lifts the shakeout sand to a measuring hopper or a storage bin over the muller where sand will be mulled and aerated properly. Sand then is distributed to the molding stations by the tractor shovel, which also serves to return the sand and castings to the shakeout oscillator. This is a highly flexible unit for the small foundry and should be considered for the initial installation, as a small unit that can be expanded in the future if desired.

Automatic operation of sand preparation plants has been accomplished with sand storage bins, apron feeders for drawing measured amounts from the sand storage bin, and bond feeders for accurately proportioning the bonding ingredients. All operations are performed automatically by electrically timed control, so that the mullers operate and discharge alternately for continuous flow of prepared sand to the system. Moisture control equipment also is automatic, so that uniform molding sand is produced automatically for the high-production foundry. (*Please turn to page* 216)

STRESS VS STRAIN IN HOT TEARING

By JOHN B. CAINE
Foundry Consultant
Cincinnati

Pointing out that 10 per cent of hot tearing occurs in a fashion diametrically opposed to what is predicted by stress considerations, the author suggests here the possibility of a strain concept of hot tearing

A DISCUSSION of stress and strain in hot tearing is perhaps quibbling. Usually it makes little difference whether we say and think stress or strain. In a few cases—around 10 per cent—it does, and many times this 10 per cent represents the castings that cause the most trouble and expense in the foundry.

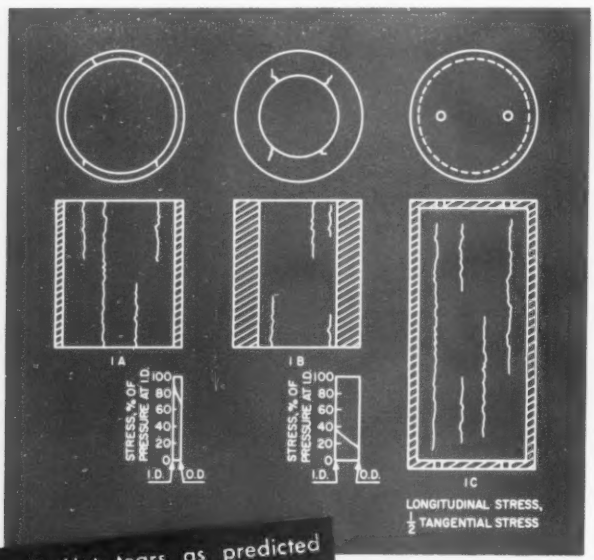


Fig. 1—Hot tears as predicted by stress present in cylinders

This matter of stress and strain has become quite important since Bishop, Ackerlind and Pellini[1] advanced the final proof that hot tears form through liquid films present when the metal is over 95 per cent solid and then advanced their strain theory of hot tearing. If these findings are accepted—and it is difficult not to accept them—stress cannot be used in any study of hot tearing, for a liquid cannot transmit tensile stress. Compressive stress occurs, but tensile stress is required for rupture. A mass composed of solid dendrites separated by thin films of liquid metal has no cohesion except that due to liquid surface tension and perhaps to a slight interlocking of the solid, plastic dendrites. This cohesion cannot transmit more than ounces or, at the most, a pound or so of tensile stress.

A basic difficulty in substituting strain for stress arises from classical mechanics and strength of materials which teach the sequence stress-strain. This difficulty is merely mental, for this sequence is only a matter of habit. Classical mechanics can be adapted to strain rather than stress merely by reversing the sequence to strain-stress. There are examples, even in classical mechanics, of this reversed sequence.

First, let us define what stress and strain are. Webster gives the following definitions: *Stress*—Mutual force or action between contiguous parts of a body caused by external force. *Strain*—Distortion due to stress, or force.

According to these definitions, strain is the result of stress, and the mechanical engineer views these two phenomena in this sequence. Strain (contraction or elongation of the part) occurs as the result of the force applied, which is stress. However, this view is not necessarily correct in all cases. The universal acceptance of this sequence is due only to the fact that in mechanics, strain results from stress in the great majority of instances.

An example of the reverse sequence, taken directly from classical mechanics and strength of materials, is that of a shrink fit. In this example, shrinkage of a hub or rim about an axle or center (strain) causes the stress that holds the parts together. This example from classical mechanics may seem exactly analogous to that in the foundry when metal is shrinking around a core. However, in some instances (the 10 per cent) the casting shrinking around the core does not behave as it should if only stress, as predicted by strength of materials, is used.

Shrink fits have been studied both theoretically and experimentally to the point that their mechanics can be expressed by a simple but cumbersome equation. This equation can be expressed graphically for any given shape as shown in Fig. 1.

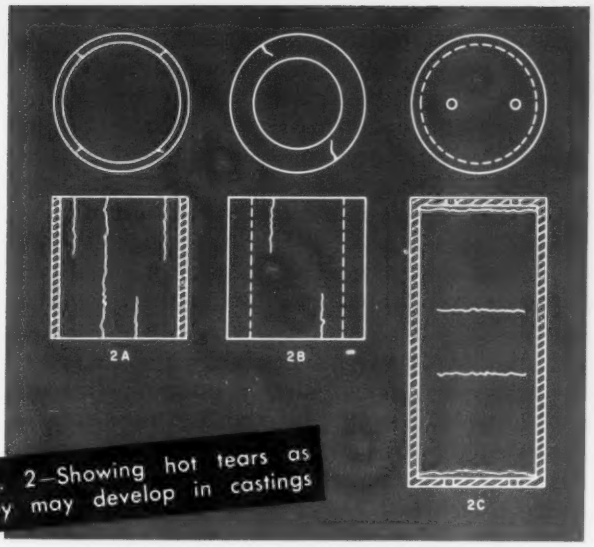


Fig. 2—Showing hot tears as they may develop in castings

Then, too, shrink fits in mechanics are only a special case of the general problem of pressure-containing vessels. Three important points derive from Fig. 1 and from the general laws of pressure-containing vessels that are important in this discussion of hot tears:

1. When one part is shrinking around another, the major stress is tangential (causing ruptures parallel with the major axis), and the stress is at a maximum at the inner diameter or surface (Fig. 1a).

2. This tangential stress decreases toward the outer diameter or surface. The amount of stress at both inner and outer surfaces decreases as the wall thickness increases (Fig. 1b).

3. If a casting is shrinking around a core surrounded on four sides by metal, the longitudinal stress—causing peripheral ruptures—is only half of the tangential stress—causing longitudinal ruptures (Fig. 1c). The same conditions apply if the casting is shrinking around a core open on both ends and clamping itself to a relatively noncollapsible core to prevent longitudinal contraction.

If castings shrinking around a core follow the stress laws of shrink fits and pressure-containing vessels, hot tears should occur as shown in Fig. 1. They should start on the inner surface in contact with the core. The susceptibility to hot tears in the outer surface should always be less than in the inner surface, and this susceptibility should decrease as the wall section of the casting increases. The relative severity of peripheral hot tears should be less than (not over half) longitudinal hot tears.

Castings never heard of strength of materials, however, and they do not hot tear as demanded by the book. Thin-walled castings do start to hot tear at the inner surface as predicted by mechanics. As the wall section increases, hot tears start to form in the outer walls, with no hot tears in the inner walls, as shown in Fig. 2b. This action is diametrically opposed to that predicted by stress considerations.

Foundrymen are only too familiar with peripheral hot tears in long castings shrinking around a core, as shown in Fig. 2c. Stress says that these just should not be. The castings should show bad longitudinal hot tears before any peripheral hot tears form, as shown by Fig. 1c.

The hot tears shown in Figs. 1 and 2 are those expected by stress and strain, uncomplicated by foundry variables. Sand collapsibility, shrinkage, fillets and temperature gradients imposed by gates and risers complicate the picture. To the writer it is necessary to study the simpler cases first, before complications can be introduced. Simple round cylinders are shown merely for simplicity. The same general laws apply to almost any shape; irregular shapes merely add complications, not only in the foundry, but also to the extent that they cannot be handled by simpler mechanics.

The actual behavior of these castings can be explained to a greater exactitude if strain (contraction) is substituted for stress. In the case of thin sections shrinking around a core, the amount of strain, as determined by the inner and outer circumferences, is not too different, and stress does have a slight influence. Therefore ruptures occur or start at the inner surfaces if conditions are favorable to hot tearing, as predicted by the laws of mechanics.

As the casting section is made thicker, the outer surface contracts more than the inner because of the greater difference in circumferences. Therefore the amount of strain is greater at the outer surface, and the casting is more prone to hot tear in the outer surface than in the inner surface. Hot tears in the outer surface still can be influenced

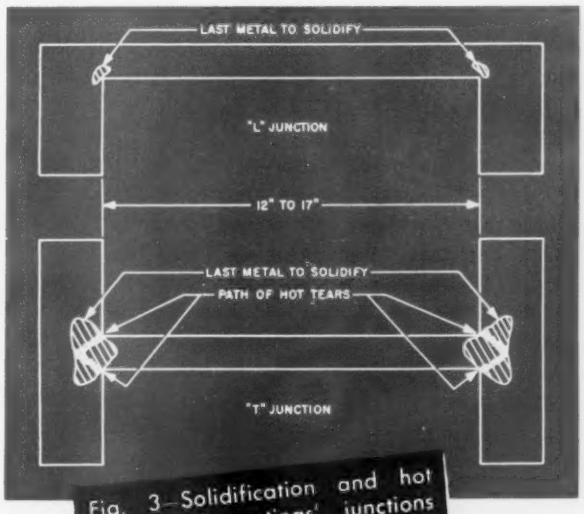


Fig. 3—Solidification and hot tearing of castings' junctions

by pressure and core collapsibility, for a liquid can transmit compressive force to the outer surface and prevent contraction. It is this restraint that causes the strain. The writer has shown in a previous article[2] that hot tears can occur with a change in contraction strain measured in thousandths of an inch. This fact explains why hot tears jump from the inner to the outer surface

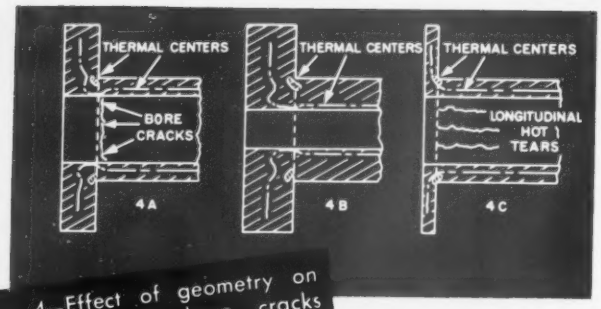


Fig. 4—Effect of geometry on thermal centers, bore cracks

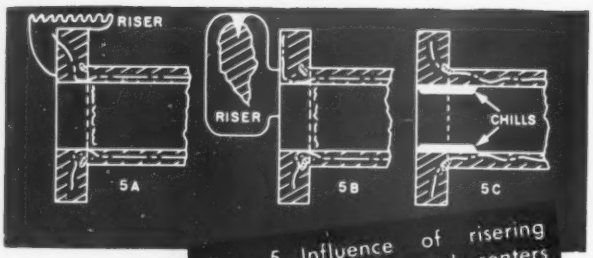


Fig. 5—Influence of risering and chills on thermal centers

with just a slight change in wall thickness for any given core diameter.

Similarly, strain explains why a relatively long cylinder shows peripheral hot tears rather than the longitudinal hot tears demanded by stress. There simply is more contraction and therefore more strain longitudinally than tangentially because the casting length is greater than its circumference.

If the strain concept of hot tearing is carried from the microscopic scale (interdendritic liquid films) to a macroscopic scale, strain concentration, as determined by shape, size and hot spots of the casting, can explain many mysteries. One simple example is the great difference in hot tearing of "L" and "T" junctions, as shown in Fig. 3. According to the laws of stress, the "L" section should hot tear about half as badly as the "T" junction because there is only half the area in the restraining flanges to hinder contraction and cause stress.

Actually, it is impossible to hot tear the "L" junction when it is made under normal procedures, even with "hard" cores in lengths up to 17 in. between the flanges. It is almost impossible to prevent hot tearing in the "T" junction in lengths exceeding 12 in. without the use of chills.

If any critic thinks he can make the "T" junction in lengths 12 in. and longer without precautions and without hot tears, he should use magnetic powder inspection or deep etch before calling me a liar. One can make the "L" junction hot tear, but not without a lot of trouble.

Strain and the thermal studies of Brandt, Bishop and Pellini[3] explain the great difference in hot tearing susceptibility of these two shapes, as shown in Fig. 3. The solidification pattern of the "L" junction is such that the hot spot at the fillet is possibly in compression and cannot hot tear. Even though it is not in compression, there is no path of solid-liquid metal for the hot tear to follow.

Just the opposite condition is present in the "T" junction. There is a path for the hot tear to follow through the hot spot. It is significant that hot tears in this junction follow just the path dictated by the solidification pattern. In fact, if this junction is formed by a round contracting member and a "hard" core is used so that the strain is high, the end of the contracting member will pull out of the restraining flanges like a conical pencil point.

This matter of stress and strain now is no longer only academic. It just is not possible to eliminate hot tearing in the "T" junction by increasing or decreasing strength. The only ways to do so are to decrease the amount of strain by allowing the casting to contract freely or to change the solidification pattern so that the hot spot does not present a path for rupture. It is not a matter of using a weaker sand; the sand must collapse. The amount of collapsibility need not be great; a thousandth of an inch per inch or so of contracting length is sufficient, but within these dimensions the sand must collapse completely.

Recent work, as summarized by the writer in FOUNDRY about a year ago[2] emphasizes this point. It was not possible in any of the experimental work to correlate the strength of the sand at any elevated temperature with hot tears. About the only property that could be correlated at all was sand density, but the correlation was far from good. Perhaps strain can explain this difficulty.

Start of Hot Tear Is Important

As far as hot tearing is concerned, contraction strain is important only through a limited temperature range of less than 50° F. The amount of strain is only a thousandth of an inch or so. After this critical range has been passed, restraint only widens the hot tears or affects the final dimensions of the casting. Unfortunately, a tiny hot tear is just as dangerous as a wide open one, so we must be interested in the start of the hot tear.

It is probable that the density of only the first few thousandths of an inch of sand is important in starting the hot tear. No method of measuring the surface density of a sand mass is known at present, but it is known from the work of the AFS Flowability Committee[4] that this surface density is not measured by the density of the sand mass as a whole. The committee had the same trouble trying to measure surface voids by mass density. Some correlation existed, but it was far from perfect, or even acceptable.

If the "L" junction of Fig. 3 is wrapped around a core, a very common casting shape is formed, the flanged cylinder. Pipe and valve ports are just two of hundreds of casting designs that incorporate this shape. It is a shape that is vulnerable to one of the steel foundryman's most irritating enemies, the bore crack. Probably this same defect is common in this shape cast in any metal that freezes dendritically to completion, as does steel.

Bore cracks in steel castings have been investigated thoroughly by Brinson and Duma[5].

This type of hot tear is characterized not only by its peculiar location (it just should not occur in this location), but also by its insensitivity to all changes in foundry practice except design and chilling of the inner bore surface. Risering, gating, brackets and collapsible cores have little or no effect on bore cracks. Another peculiarity of bore cracks is their insensitivity to over-all restraint—perhaps a heritage from the "L" section of Fig. 3.

If the thermal data for junctions of sections are combined with those determined for hollow cylinders by the same investigators[3], the thermal gradients can be guessed at, as shown in Fig. 4. It must be emphasized that these thermal gradients in Fig. 4 are little better than guesses. The lack of information in this field is so great that it is not possible to even add one and one with any certainty that the answer will be close to two. However, the answer does seem to check with experimental and production observations. The dash-dot lines in Fig. 4 are the estimated longitudinal thermal centers of several flanged cylinders.

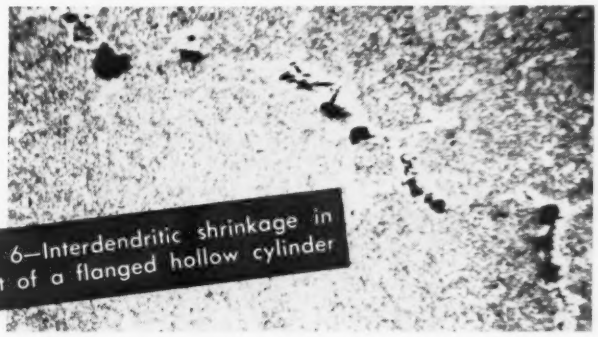


Fig. 6—Interdendritic shrinkage in fillet of a flanged hollow cylinder

Note the abrupt change in the thermal center of design 4a, in the region where bore cracks occur. When the sections are thicker and the core smaller, as in design 4b, the change in thermal gradients is not as great because the thicker walls and smaller core move the thermal center toward the core surface. It is significant that both production and experimental experience indicate that "chunkier" flanged cylinders do not seem to be as liable to bore cracks as the 4a design.

In the past, this fact has been explained on the basis that the thicker sections "break down the core" and cause less stress. Stress has never been able, however, to explain the peculiar location and direction of these ruptures. Stress has never been able to explain why bore cracks occur even with the most collapsible cores and especially why they are unaffected by changes in over-all restraint. A single flanged cylinder shows the same amount of bore cracking as a double flanged cylinder.

The strain theory can explain the location and direction of these ruptures by showing that temperature gradients concentrate longitudinal contraction in this area, which offers metal at the critical film stage for a greater length of time than at any other location along the bore surface. The fact that the thermal center is more nearly parallel with the bore surface at both sides of the area liable to bore cracks makes for less strain concentration because of dispersion of contraction at any given time over a greater length.

If the flange section is thinner than the bore section, as shown in Fig. 4c, the thermal center is displaced from the casting corner, and the knee in the thermal-center line in design 4a is eliminated. There then should be less probability of bore cracks with design 4c, and this reasoning checks with Brinson's and Duma's findings. Changes in risering these junctions do not change the thermal gradients when the design is likely to cause a knee, as in design 4a. This point is shown by Figs. 5a and 5b and checks with experimental and production experience. Chilling the inner bore surface does change the thermal gradients favorably, as shown by Fig. 5c. This (*Please turn to page* 233)

Fig. 7—Load and amount of hot tearing induced by various sand mixtures (Middleton)

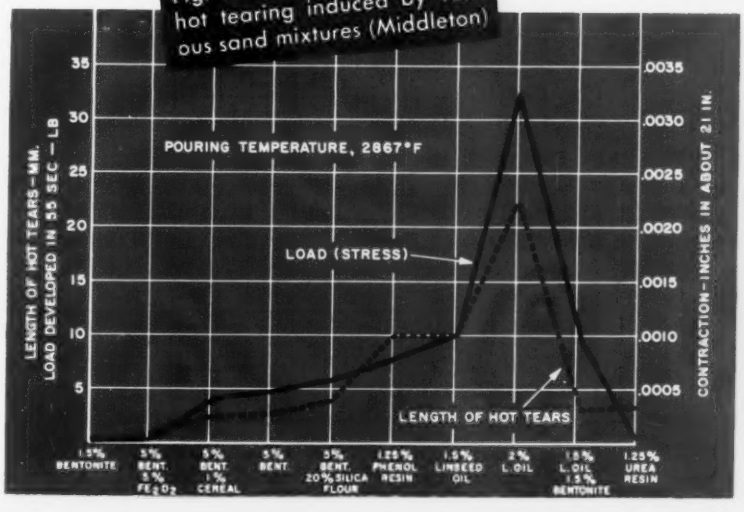
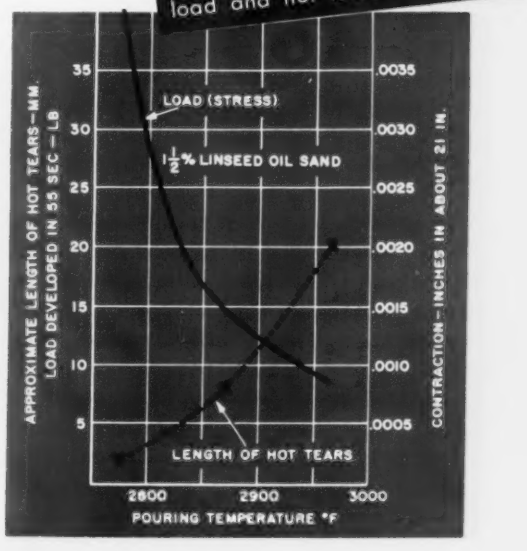

LENGTH OF HOT TEARS – MM. LOAD DEVELOPED IN 55 SEC – LB
CONTRACTION – INCHES IN ABOUT 21 IN.
POURING TEMPERATURE, 2867°F
LOAD (STRESS)
LENGTH OF HOT TEARS
1.5% BENTONITE
5% BENT. 5% Fe2O3
5% BENT. 1% CEREAL
5% BENT.
5% BENT. 20% SILICA FLOUR
1.25% PHENOL RESIN
1.5% LINSEED OIL
2% L. OIL
1.5% L. OIL 1.5% BENTONITE
1.25% UREA RESIN

Fig. 8—Illustrating the relation of pouring temperature to load and hot tears (Middleton)


APPROXIMATE LENGTH OF HOT TEARS – MM. LOAD DEVELOPED IN 55 SEC – LB
CONTRACTION – INCHES IN ABOUT 21 IN.
LOAD (STRESS)
1½% LINSEED OIL SAND
LENGTH OF HOT TEARS
POURING TEMPERATURE °F

Foundries can be made safe places in which to work. The author describes in his article the top management program that enabled each of his company's three foundries to reduce its accident frequency sharply

FOR a number of years the foundry industry has broadcast the slogan, "The Foundry is a Good Place to Work." For probably as many years, foundry management has been interested in being able to say, "The foundry is a *safe* place to work." Members of the steel foundry industry have been trying to make this statement a reality, and we think that some definite progress has been made.

A review of the 1953 "Lost Time Injuries Report" of the Steel Founders' Society reveals that the over-all frequency last year was 19.2. During that year, however, 28 steel foundries carried a frequency of 10 or less. Of these 28, three were the steel foundries of Continental Foundry & Machine Co., East Chicago, Ind.; 1953 was the first year in which all of Continental's plants achieved the "10 or less" distinction.

It hardly needs to be said that this ranking did not just happen. Behind this small incident lie many years of thinking, planning and doing, a recital of which may be of some help to others in our industry.

First, it might be well to review the ten-year history of Continental's safety record as shown in the accompanying table.

It will be noted that this record begins with the high employment level of a World War II year, 1944. With decreasing employment in 1945, 1946

By H. A. FORSBERG
Vice President
Continental Foundry & Machine Co.
East Chicago, Ind.

Employees of the Pittsburgh Works are greeted by this safety record sign as they come to work each day. Daily recording keeps it up to date

The 1953 sand division good housekeeping award was won by Hull Foundry, at the Chicago Works

(Inset)—A safety contest between plants at the Pittsburgh Works was publicized by this poster

(Above)—A television and radio set was raffled off at a Chicago Works safety rally, but names of employees who had had accidents and of foremen of their departments were not placed in box

and 1947, no improvement was shown in our safety record. Our present drive, as evidenced by the record, began during 1948, and we have shown a definite improvement since that time. Perhaps the most significant point in our record is that we doubled our employment from 1950 to 1952—Korean war years—without appreciably increasing our frequency rate. As is generally recognized, lengthening of the work week and sharp increases in hiring usually result in increased accidents. Somehow or other, we were able to overcome the trend!

ACCIDENT FREQUENCY RATE, 1944-1953

Year	Frequency	Year	Frequency
1944	19.46	1949	12.79
1945	21.70	1950	11.10
1946	22.35	1951	12.64
1947	21.10	1952	12.98
1948	18.65	1953	7.86

Ingredients for Success—What, then, can be said of the many things which have helped in the drive to make Continental plants safe? There can be no question that the first and foremost factor is the attitude of top management. Unless top management is thoroughly concerned and provides the spark, middle management and the workers themselves hardly can be expected to carry on. Without the real, vocal and continuing interest of top management, those men in an organization who have the task of implementing safety programs will

Safety supervisor at the Wheeling Works directs the actual operation of resuscitation equipment

Avoiding lost-time accidents for 3000 days won an award for the Pittsburgh Works pattern shop

Wheeling Works was winner of Continental's top safety award in the March safety flag contest

At Wheeling Works, members of the plant safety committee meet with Safety Supervisor Harold Mullarkey, who appears at the end of the table

never be able to do those things which are necessary to prevent accidents.

Interest itself is not enough, however. There must be planning for an intelligent job plus determination to see the job through. In safety work, planning sooner or later organizes itself into definite rules and regulations. Safety rules are most necessary so that employees may know what they are required to do, how they are to do it and, particularly, what they are prohibited from doing.

But safety rules are important for still another reason. Both supervisors and men must be on notice that safe practices are an essential part of operations. While it is trite to say that no one will injure himself deliberately, the fact is that in any plant some employees are willing to take a chance to cut a corner here or use an unsafe practice there. If it is tolerated or permitted, the chance-taking sooner or later will result in a lost-time accident. However, with both supervisors and men fully aware of the safety rules, there is a sharp curtailment of the chance-taking, even though supervision may have to resort to disciplinary action to enforce safety rules.

Watch the Eyes and Feet—No set of safety rules can be devised which will apply with equal validity in all foundries. Plant layout, equipment and operating processes vary, and each set of rules must, of necessity, apply only to the plant for which it is prepared. Two particular safe practices, however, we believe to have universal foundry application. The first is the required wearing of safety glasses, and the second, the required wearing of safety shoes. Although we are firmly convinced of the necessity of these two rules, we had to learn the hard way.

Until 1953, the wearing of safety glasses was not compulsory in all our plants. One plant in which the rule was put into effect for the first time in 1953 had a total of 148 eye cases which required a doctor's attention. But the program was begun during July. One hundred and three of the eye cases occurred during the first six months of the year; only forty-five occurred after the safety glass rule went into effect. This improvement was entirely in line with our experience in our other plants.

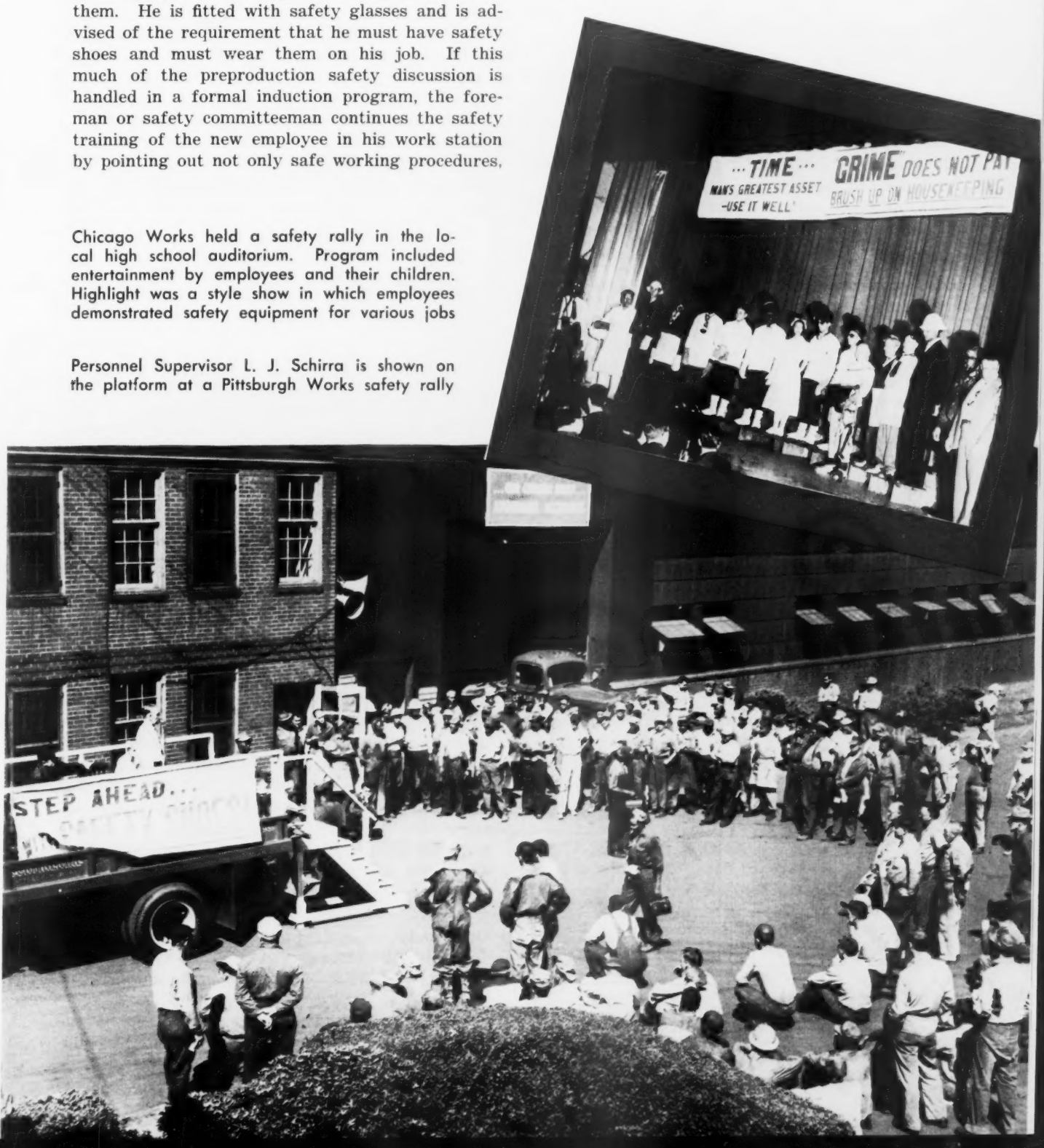
There obviously is no way of knowing how many foot injuries are prevented by the wearing of safety shoes, for in most instances the employee who drops something on his foot makes no report. We know, however, from industry surveys, that as high as 40 per cent of foundry injuries are the result of such things as dropping hand loads, pinching toes and bumping sharp objects. All of these classes of injuries are reduced materially by the wearing of safety shoes.

Training Program Important—A vital adjunct to the establishment of safety rules is, of course, a safety training program, since the rules are not effective unless they are known and understood. Familiarizing employees with the safety rules can be done in a number of ways. We believe that a combination of methods should be used since no one

method can insure that every one has a thorough knowledge of the rules. Our own methods include weekly departmental safety meetings for all employees, foremen and safety committeemen responsible for instructing individual employees. Rules also are posted on bulletin boards throughout the plant.

Most companies today have some type of induction or orientation program for new employees. The day of just "putting a man to work" long since has passed. There is no need to go into detail concerning what is covered in this type of program, but there is no doubt that safety must be emphasized and impressed upon the new employee. The plant safety rules are explained in detail. The new employee is encouraged to ask questions about them. He is fitted with safety glasses and is advised of the requirement that he must have safety shoes and must wear them on his job. If this much of the preproduction safety discussion is handled in a formal induction program, the foreman or safety committeeman continues the safety training of the new employee in his work station by pointing out not only safe working procedures, but also the potential hazards in the department in which he is to work and on the particular job to which he has been assigned.

Each of the Continental plants has a safety committee. Because of differing local conditions, no two committees are organized exactly alike, but we feel that each of them does a satisfactory job for its plant. A safety commitee can become ineffective, however, without the proper leadership to see that the committee remains active by regular attendance at meetings and, particularly, by definitely following up recommendations made by the committee. Where such recommendations cannot be followed, the reasons must, of course, be made clear to the committee. (*Please turn to page* 192)



Chicago Works held a safety rally in the local high school auditorium. Program included entertainment by employees and their children. Highlight was a style show in which employees demonstrated safety equipment for various jobs

Personnel Supervisor L. J. Schirra is shown on the platform at a Pittsburgh Works safety rally

Effect of Melting Frequency on the Properties of

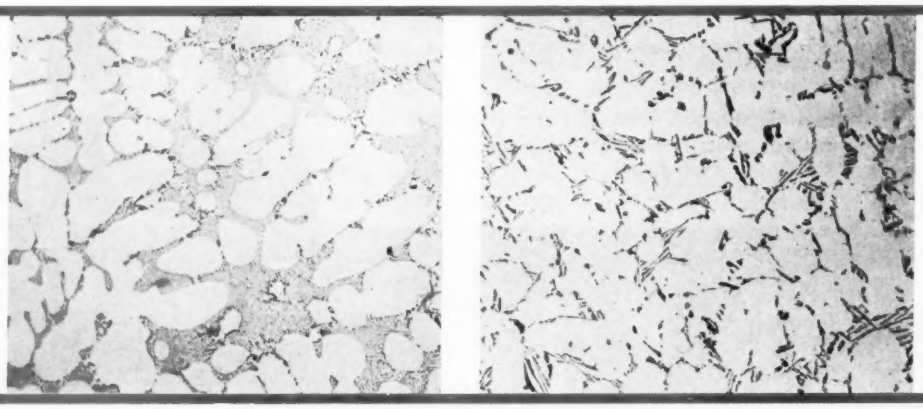
Induction Melted Aluminum Alloys

Stirring action in induction melting is a function of the frequency of the equipment. The authors evaluate the influence of melting frequency in coreless furnaces on mechanical properties of aluminum alloy castings

ALTHOUGH aluminum alloys for foundry use are usually melted in gas or oil fired pot type furnaces, in recent years many foundries have installed electric induction type furnaces for this purpose. This equipment eliminates some of the undesirable characteristics associated with combustion type furnaces. However, induction units have one characteristic which has been regarded as harmful to metal quality. This characteristic is the stirring action generated in the melt.

Although stirring action is considered desirable for promoting homogeneity in the melt, it may also act to entrain oxide films. The degree to which this stirring occurs is a function of the frequency of the induction equipment. While low-frequency units are most commonly used for melting applications, the lower the frequency, the more vigorous is the stirring action.

Fig. 1 — These unetched microstructures were obtained from No. 356 aluminum alloy control and 20-kc induction melted castings before heat treatment



CONTROL MAG 75X INDUCTION MELTED 20 KC

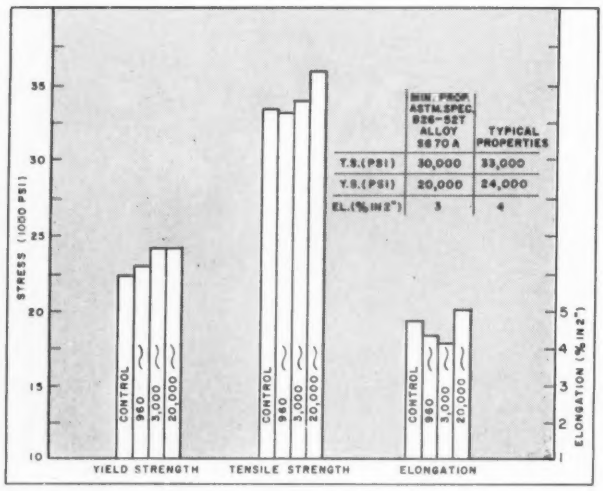


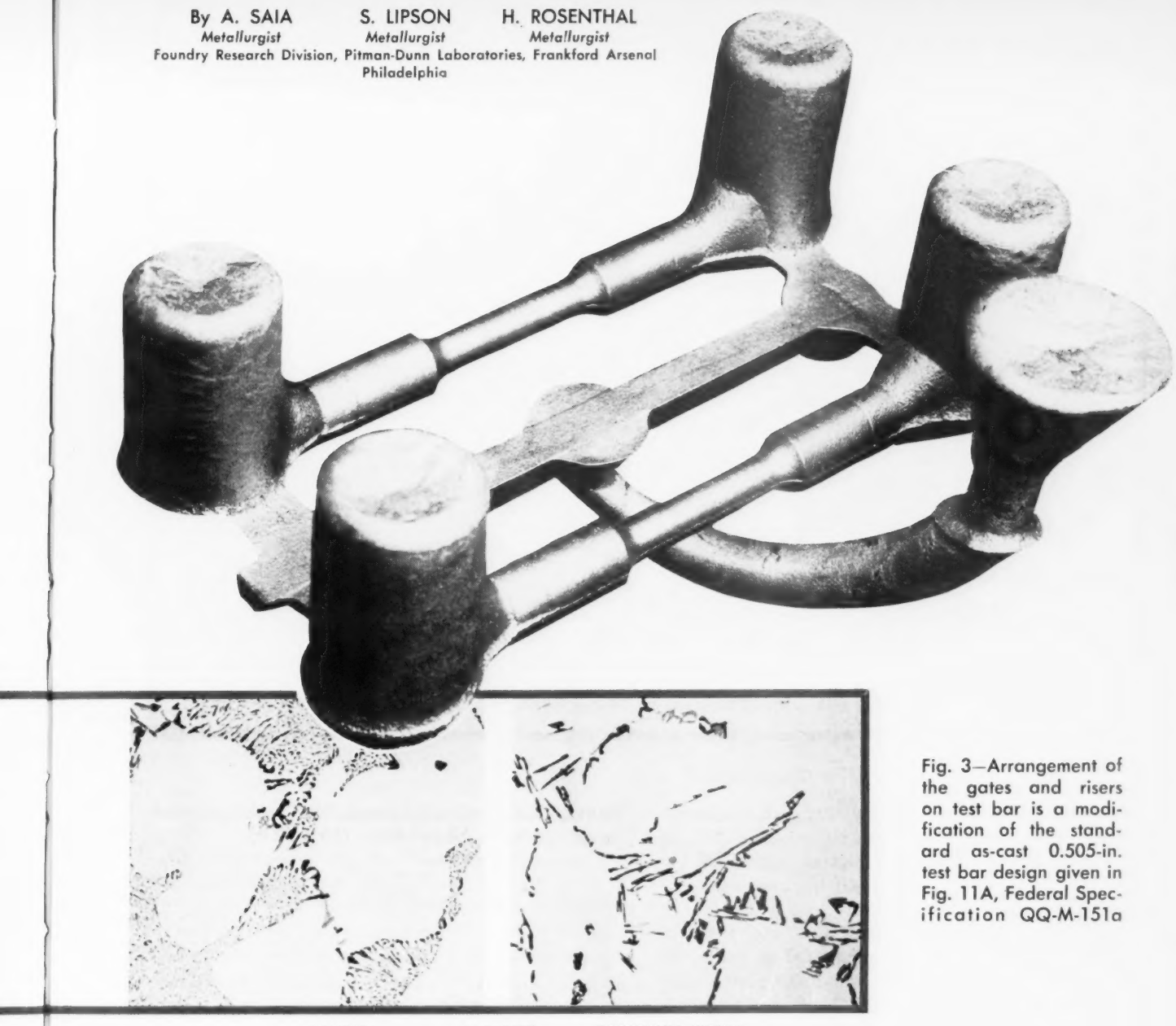
Fig. 2—After heat treatment, the No. 356 aluminum alloy bars showed improvement in properties with an increase in the melting frequency

Electric induction furnaces specifically designed for melting operate in the frequency range from 60 to 20,000 cycles. The low-frequency units are less costly (Ajax-Tama 60 - cycle furnace) but the higher-frequency coreless units are more flexible and convenient to operate.

In selecting equipment for melting aluminum alloys, the frequency of the generator may be determined on the basis of cost or operating characteristics. The precise degree to which the stirring action functions to prejudice or improve the quality of the melt is not known. It is the purpose of this study to evaluate the influence of melting frequency in coreless type furnaces upon the mechanical properties of castings produced with this metal.

Alloys Studied—This study was based on the properties obtained with two representative alu-

By A. SAIA, *Metallurgist*; S. LIPSON, *Metallurgist*; H. ROSENTHAL, *Metallurgist*
Foundry Research Division, Pitman-Dunn Laboratories, Frankford Arsenal
Philadelphia



CONTROL MAG 250X INDUCTION MELTED 20 KC

Fig. 3—Arrangement of the gates and risers on test bar is a modification of the standard as-cast 0.505-in. test bar design given in Fig. 11A, Federal Specification QQ-M-151a

minum casting alloys. The heat treatable alloy bearing the commercial designation No. 356 was tested in both the as-cast and T6 condition. Alloy No. 85 was selected and tested as a non-heat-treatable alloy. A master heat of each alloy was prepared and ingoted for use in the individual melting experiments. The chemical analyses of these heats are given in Table I. These alloys, with the exception of silicon, conform to the applicable specifications. The silicon content of the No. 85 alloy is slightly below the minimum specified. It was felt that this would have no significant effect on the results of these tests.

Molding Practice—Fig. 3, illustrating the test bar, shows the arrangement of gates and risers. This arrangement is a modification of the standard as-cast 0.505 test bar design given in Fig. 11A of Federal Specification QQ-M-151a, for aluminum alloys. A horn gate was used to produce a bottom gating effect. These test bars were molded in a synthetic sand of 80 AFS fineness. The sand had additions of approximately 1.5 per cent southern bentonite and 1.5 per cent western bentonite, 0.25 per cent cereal (Mogul) and 2.5 per cent moisture.

Melting Practice—The master heats were prepared by melting 125 lb of alloy in a Lindberg-Fisher tilting-type gas-fired furnace. The metal temperature was raised to 1300° F; the melt was flushed for three minutes with chlorine and skimmed. The temperature was then permitted to fall to 1225° F, the control castings poured, and the remainder ingoted for the induction melting experiments. Melts were then made in each of the following electric induction furnaces and poured into test bar molds. A standard pouring temperature of 1225° F was used for all test bar molds.

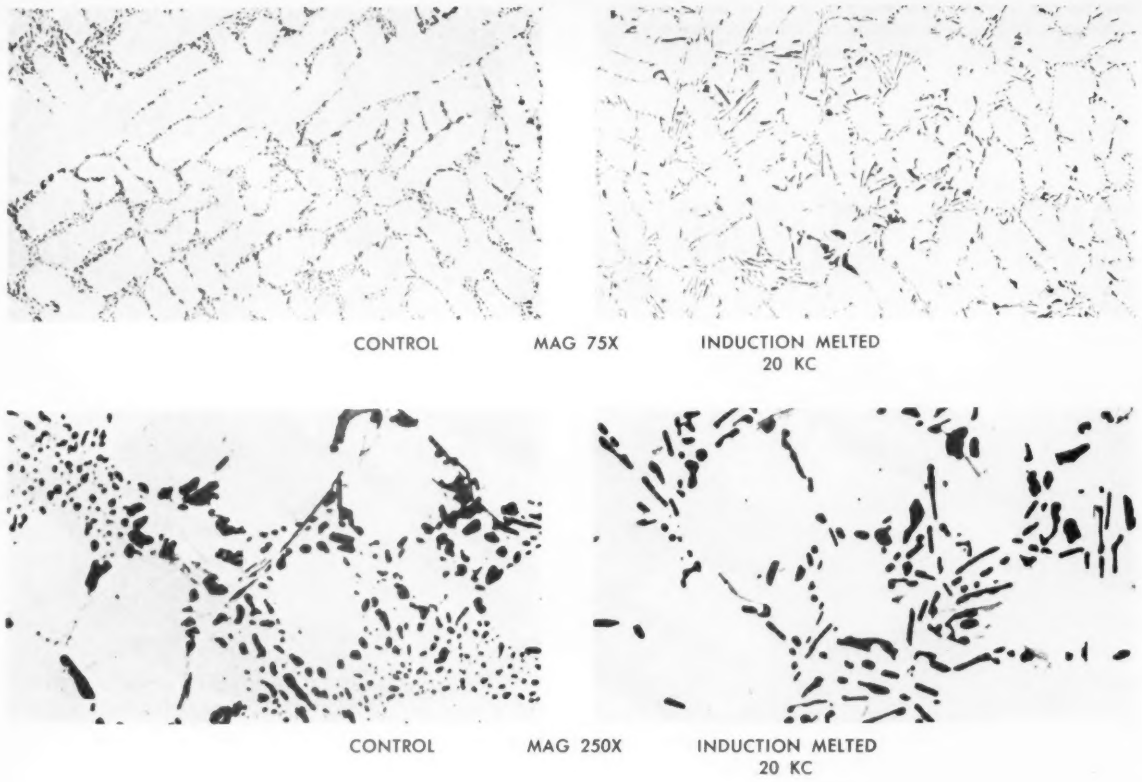


Fig. 4—Unetched microstructure of heat-treated (T6) No. 356 aluminum alloy casting

1. Ajax 960-cycle, 167-kw lift coil furnace. Twenty pounds of alloy were melted in a No. 30 clay graphite crucible. A power setting of 30 kw was used and approximately 40 minutes were required for the melting cycle.

2. Ajax 3000-cycle, 100-kw lift coil furnace. Twenty pounds of alloy were melted in a No. 30 clay graphite crucible. A power setting of 30 kw was used and approximately 25 minutes were required for the melting cycle.

3. Ajax 20,000 cycle, 20 kw mercury arc furnace. Six pounds of alloy were melted in a No. 6 clay graphite crucible. A power setting of 15 kw was used and approximately 21 minutes were required for the melting cycle.

The specimens were identified with the following code: 1 = 960-cycle furnace; 3 = 3000-cycle furnace; 6 = 20,000-cycle furnace. AC = as cast. HT = heat treated (T6 condition, 1000° F, 18-hr solution treatment; 310° F, 4-hr aging). C = control heat (from gas-fired furnace). The prefix "X" designated the No. 85 alloy. Symbols without prefix refer to the No. 356 alloy.

The cast tensile bars were subjected to radiographic inspection, heat treated as indicated, and tested in tension using an automatic stress-strain recorder. Tensile strength, yield strength and elongation were reported.

Tensile Test Results—The results of the tensile tests are given in Table II. For each condition, three molds were cast. One specimen from each mold was tested in the as-cast condition and the other in the heat-treated condition.

TABLE I—Chemical Composition of Aluminum-base Alloys Nos. 356 and 85

	——No. 356——		——No. 85——	
Element	Master Heat	ASTM Spec. B26–52T Alloy SG70A	Master Heat	ASTM Spec. B85–52T Alloy SC54A
Cu	<0.05	0.2 Max	4.30	3.0–4.0
Si	6.70	6.5–7.5	4.44	4.5–5.5
Fe	0.26	0.6 Max	0.46	0.3 Max
Mn	0.02	0.3 Max	0.07	0.5 Max
Zn	0.01	0.3 Max	0.03	1.0 Max
Mg	0.30	0.2–0.4	<0.01	0.1 Max
Ti	0.11	0.2 Max	0.02	
Al	R	R	R	R
Pb	<0.01	0.05 Max	0.03	
Sn	<0.01	0.05 Max	0.03	

<=Less than. R=Remainder

Tensile strength of the No. 85 alloy shows insignificant variations under any condition of melting. Specimens representing the No. 356 alloy in the as-cast condition gave data very similar to the data obtained with the No. 85 alloy. The properties showed very slight improvement with increase in melting frequency and were approximately equal to the properties obtained with the control castings. After heat treatment of the No. 356 alloy bars, the data, as shown in Fig. 2, revealed improvement in properties with increase in melting frequency, with a moderate improvement over the control castings.

All values obtained were in excess of the minimum properties specified for these alloys and were nearly equal to or better than typical properties reported in the literature.

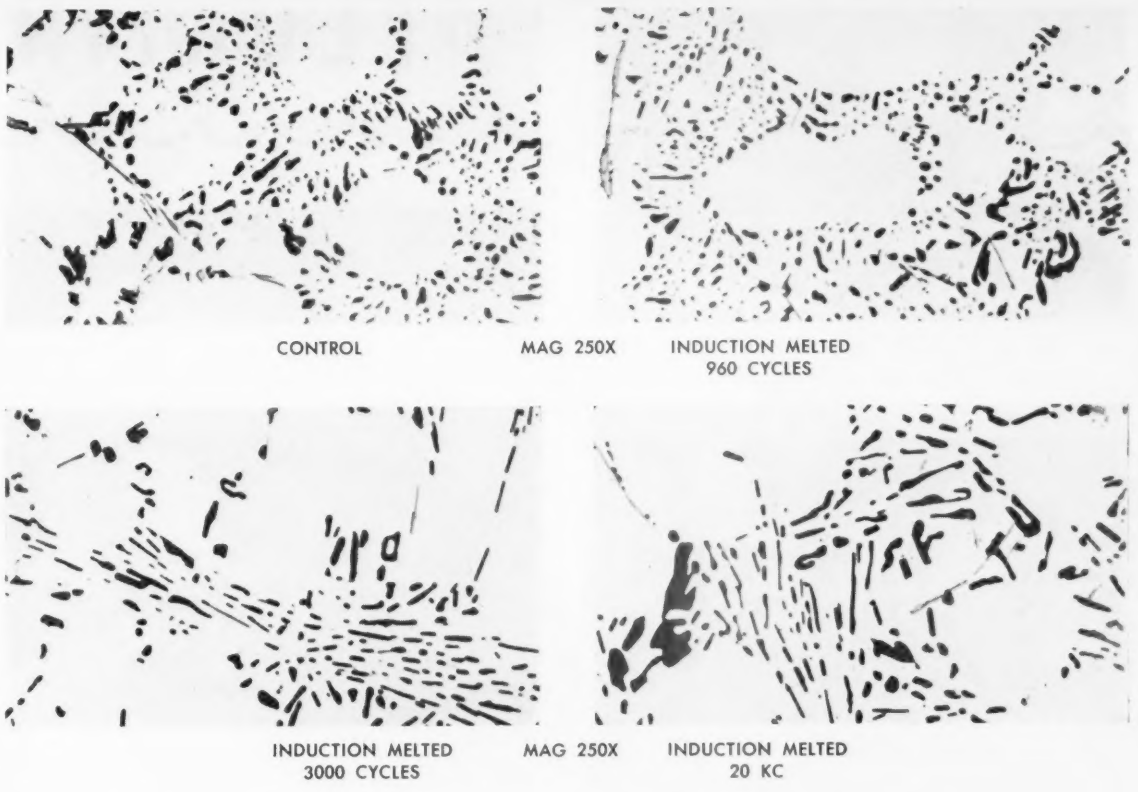


Fig. 5—Effect of melting frequencies on structure of heat-treated No. 356 alloy

Metallographic Examination — Sections taken from the ends of the test bars were examined metallographically. Fig. 1 shows the structures obtained with No. 356 alloy control casting and the 20-kc induction melted casting before heat treatment. The control casting shows the primary aluminum dendrites and a finely dispersed aluminum-silicon eutectic. In the induction melted sample, the aluminum-silicon eutectic is coarser and has a needle-like form. After heat treatment the same general pattern persists. This is shown in Fig. 4. The eutectic in the control casting was coarsened by the solution treatment. The eutectic in the induction melted sample was also somewhat coarsened.

Fig. 5 shows the effect of the melting frequencies upon the structure of the resulting casting after heat treatment. The structure obtained with the 960-cycle induction melted specimen is similar to that of the control sample. As the melting frequency is increased, the eutectic is gradually coarsened with a change from a small rounded structure to an elongated, angular one.

The microstructure of the No. 85 alloy casting was unaffected by the melting technique.

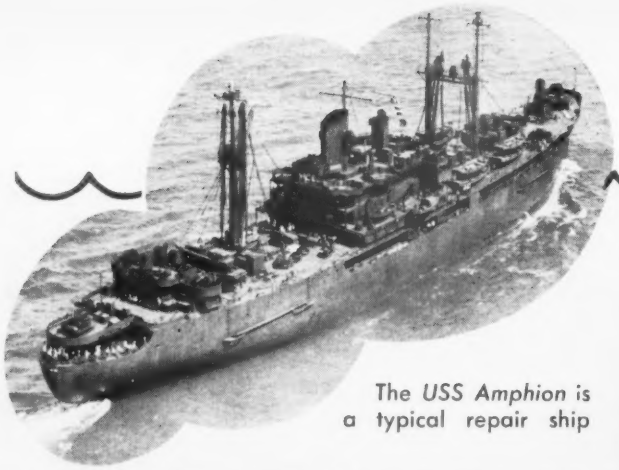
Discussion—Data for the heat-treated No. 356 alloy indicates that a correlation exists between the tensile properties and the microstructure. It was, therefore, of interest to determine what factors can influence the geometry of the eutectic.

There was a possibility (*Please turn to page* 208)

TABLE II—Tensile Properties of Sand-cast Test Specimens

No.	Code	Yield Strength (psi X 10^3)	Tensile Strength (psi X 10^3)	% Elongation 2 in. Gage Leigth	Frequency (Kc)
		Alloy No. 356 (As Cast)			
1	1AC	11.9	21.4	3.8	0.960
2		12.1	20.7	3.2	
3		12.7	22.3	4.4	
Average		12.2	21.5	3.8	
1	3AC	13.4	22.1	3.4	3.
2		12.8	22.4	4.3	
3		13.6	22.3	4.2	
Average		13.3	22.3	4.0	
1	6AC	12.6	21.7	2.9	20.
2		13.0	21.9	3.6	
3		12.7	22.5	4.6	
Average		12.8	22.0	3.7	
1	CAC	12.1	22.1	4.8	Control
2		12.4	22.2	4.8	
3		13.1	22.3	4.8	
Average		12.5	22.2	4.8	
		Alloy No. 356 (T-6 Condition)			
1	1HT	21.9	33.5	5.0	0.960
2		23.9	33.0	3.5	
3		22.9	32.8	4.5	
Average		22.9	33.1	4.3	
1	3HT	23.4	33.5	4.2	3.
2		23.8	33.4	3.9	
3		25.0	34.8	4.2	
Average		24.1	33.9	4.1	
1	6HT	23.9	34.9	5.1	20.
2		24.0	36.3	5.1	
3		24.3	35.4	4.9	
Average		24.1	35.5	5.0	
2	CHT	22.6	32.9	4.0	Control
3		21.9	33.5	5.3	
Average		22.3	33.2	4.7	
		Alloy No. 85 (As Cast)			
1	1AC		23.9	2.8	0.960
2			22.3	2.0	
3			22.7	2.4	
Average			23.0	2.4	
1	XAC		23.1	2.3	3
2			23.1	1.8	
3			23.0	1.8	
4			23.1	1.9	
Average			23.1	2.0	
1	X6AC		22.4	1.5	20
2			25.1	1.8	
3			25.3	1.8	
4			23.0	1.6	
Average			24.0	1.7	
1	XCAC		24.4	2.0	Control
2			24.2	2.0	
3			23.4	1.6	
4			25.0	2.2	
Average			24.3	2.0	

FLOATING



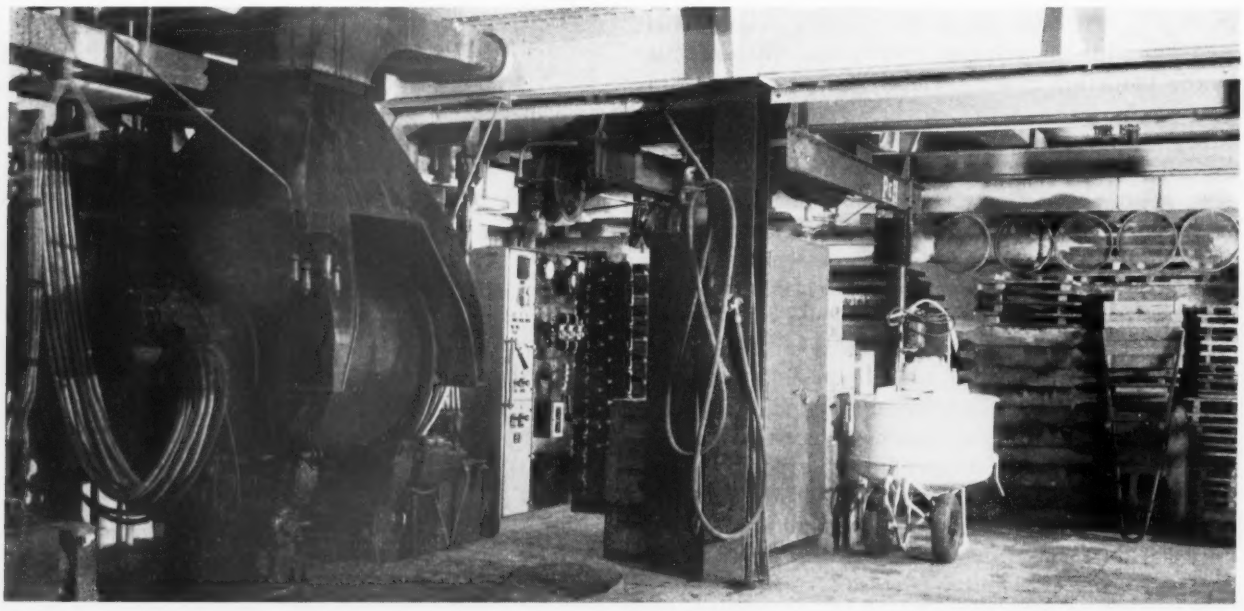
The *USS Amphion* is a typical repair ship

Also taken in the lower foundry of the *USS Hector*, view amidships shows pouring of a billet for rings

View amidships aft in lower foundry of AR-7, the *USS Hector*, shows Navy foundrymen about to close a mold

Editor's note: The statements contained in this article are the private ones of the authors and are not to be construed as official, or reflecting the views of the Department of the Navy or the Naval service at large. Mr. Bolt, one of the authors, now is associated with the Chemical Division, General Electric Co., Pittsfield, Mass.

Some of the equipment available in the *USS Hector's* foundry is visible in this view of the port side aft



FOUNDRIES

By JACK E. BOLT and WILLIAM H. BAER
Lieutenant
U. S. Naval Reserve
Bureau of Ships
Head
Casting Section
Bureau of Ships

FOUNDRIES that float are a reality in the U. S. Navy. To keep the fleet of fighting ships and auxiliaries in readiness, the Navy must provide maintenance and repair facilities for every foreseeable need. More commonly known are the naval and private shipyards located along our coastline, in which services available for naval vessels range from routine maintenance to major conversions, in addition to new construction.

With ships operating in waters all over the globe, however, facilities other than those stateside and in available foreign shipyards must be provided. This need is satisfied by the use of service ships known as repair ships and tenders. Facilities on board these vessels can be made available in practically any location and in sufficient magnitude to meet existing needs, as most recently exemplified in the Korean theater.

In the Navy's auxiliary service fleet, more than 50 ships have foundries on board, in addition to numerous other repair facilities and shops. These foundry facilities vary, depending on the class of repair ship or tender and the service for which the ship is intended.

Ships of the following classes have foundries on board.

Class	Description
AR	Repair Ships
ARG	Internal Combustion Engine Repair Ship
ARH	Heavy Hull Repair Ship
AD	Destroyer Tender
AS	Submarine Tender

The purpose of these shipboard foundries is to provide adequate facilities where and when they are needed for producing castings of any type and alloy which are required by ships undergoing services by the repair ships or tenders. These castings replace failed or worn parts or castings destroyed by battle damage.

The onboard spare parts carried by naval vessels cannot possibly be adequate to meet every emergency need for casting replacement, nor does time permit the ordering of replacement castings from supply stocks. Herein lies the basic purpose or mission of the Navy's floating foundries.

The following is typical of the foundry facilities on board repair ships (AR's).

Melting Equipment

2 500 lb indirect arc, rocking type furnaces
2 350 lb indirect arc, rocking type furnaces
1 200 lb electric furnace, induction type

Temperature Measuring Equipment

Optical and immersion pyrometers

Sand Conditioning Equipment

1 350 lb sand muller
1 power riddle

Sand Testing Equipment

1 moisture tester
1 permeability tester
1 green strength tester

Cleaning Equipment

1 sand blast cabinet

Other Equipment

Adequate flasks, molding, coremaking, patternmaking and metal handling equipment.

Classes of vessels other than repair ships (AR's) in general have smaller available space and reduced melting capacity. For comparison, typical melting equipment for destroyer tenders (AD's) and submarine tenders (AS's) is listed below:

Typical Melting Equipment

Destroyer Tenders (AD's)
1 500 lb indirect arc, rocking type furnace
1 350 lb indirect arc, rocker type furnace
1 120 lb oil-fired furnace

Submarine Tenders (AS's)
2 350 lb indirect arc, rocking type furnaces
1 120 lb oil-fired furnace

The workloads of these shipboard foundries are as varied as the numerous ship classes in the Navy. The foundry may be called on at short notice to produce practically any casting presently in service on board naval vessels. Often this task involves making a pattern or using the old part, but in many cases both existing patterns and drawings are available. In general, the workload cannot be considered to consist of recurring items. Castings typical of those frequently produced by shipboard foundries include condenser heads, pump impellers, gun mount dogs, machinery casings, valves, sheaves, gears and blanks, brackets, billets and bushings.

Foundry personnel are under supervision of the ship's repair officer. Occasionally some of the men have had civilian foundry experience, but this is rare. Men assigned to foundry work almost without exception have volunteered for shipboard foundry duty and are sent to the U. S. Naval Training Station, San Diego, California, where the Navy maintains a complete foundry training school. The training covers a period of 20 weeks, 30 hours per week, and is divided into lectures and actual foundry operations, including sand testing, melting, molding, pouring and cleaning operations.

In performing the function of quickly producing castings on the spot to meet maintenance, emergency, and battle damage requirements of the fleet, the floating foundries have earned their respected position as an invaluable link in the chain of service facilities that keep our Navy in fighting trim.

SOUTHERN FOUNDRY

Marks 65 Years of Progress

By WILLIAM G. GUDE
Managing Editor

LONG experience and modern production and marketing methods usually provide the ingredients for success in any business. In the case of the casting industry the combination of these factors can help to push back the ordinary geographical confines of a foundry's potential market area.

A good example of this is the record of Ross-Meehan Foundries, which this year is marking its 65th anniversary. Located in Chattanooga, Tenn., the company has been an important contributor to the industrial development of the South during the last half century. However, its activities are far from being confined to that area, as is strikingly demonstrated by the fact that last year it served customers in 32 different states and 15 foreign countries.

Railroad castings figured prominently in the company's early production. James Meehan, one of the founders, had been a mechanical engineer with the old Queen & Crescent Railway, now part of the Southern Railway System. When the company was organized on Jan. 28, 1889, it was known as the Ross-Meehan Brake Shoe Foundry Co. and its principal product was the brake shoe; however, the company also planned to conduct a general business in iron castings. Railroad and warehouse stoves were among its early products.

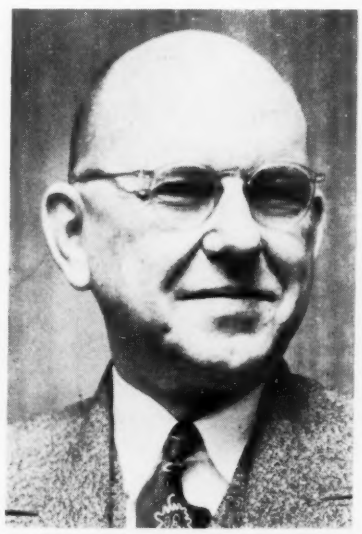
Six years after the company was founded its name was changed to the Ross-Meehan Foundry Co., and in 1896 the malleable iron castings business was entered through acquisition of the Southern Malleable Iron Works of Chattanooga. By 1902 the company's markets had expanded considerably, and it was decided to dispose of the brake shoe department. This was sold to the American Brake Shoe & Foundry Co., which, incidentally, still operates a brake shoe foundry a few blocks from the Ross-Meehan plant.

In 1903, Gus Meehan, son of James Meehan, returned to the United States from Mexico, where he had been engaged in the iron foundry business, and became president and general manager of Ross-Meehan. The company erected a converter steel foundry in 1914, and shortly thereafter the company again changed its name, this time to its present form.

In 1922, Mr. Meehan applied for a patent on his processed iron, which he called Meehanite Metal. Later the Meehanite Metal Corp. was formed to take over the patent and handle the licensing of foundries to use the process for production of Meehanite castings. It is natural that Ross-Meehan was the first of the Meehanite licensees; they are now located throughout the world, with more than fifty in the United States and Canada.

Ross-Meehan built a new steel foundry in 1924 which was said to be the first all-electric steel foundry in the country. Since the closing of its malleable iron foundry in 1932 the company has devoted its production to steel and Meehanite castings. Facilities of the malleable shop subsequently were used for the Meehanite foundry, a new machine shop and a cleaning and shipping room.

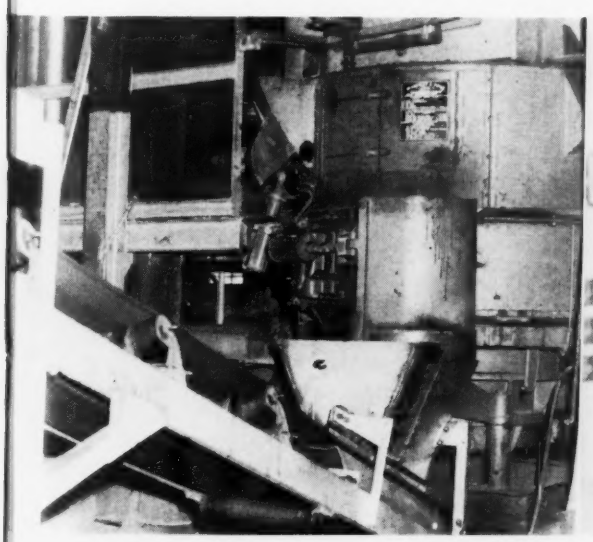
Today the company's plant comprises two separate foundry buildings—steel and Meehanite—each with a monthly capacity of about 500 tons



Frank M. Robbins, president, Ross-Meehan Foundries

Locomotive sandslinger ramming molds on the floor of the steel foundry

Part of a centralized sand preparation system installed recently to serve all molding needs of the Meehanite foundry



Quenching stainless steel castings from high-temperature pit type furnace. Quench tank can recirculate 4000 gallons of water per minute with close temperature control

of finished castings. Total employment is approximately 550.

Castings produced by the steel foundry generally range up to a maximum of 6000 pounds in weight and average 15 to 20 pounds. Approximately 75 to 80 per cent of the output consists of plain carbon steel. Alloy steel castings are made regularly in about 20 different analyses, including stainless and other heat-resistant grades.

The company recently introduced an alloy steel it is marketing under the trade name Dynalastic. Castings are produced to various tensile levels ranging from a minimum specification of 90,000 psi to 175,000 psi, with corresponding minimum yield points of 60,000 to 145,000 psi and hardness values of 207 to 341 brinell. The alloy incorporates excellent impact resistance properties at low temperatures; for instance, a grade with average tensile strength of 125,500 psi shows a Charpy keyhole-notch value of 18.5 foot-pounds at $-100°$ C ($-148°$ F).

Output of the steel foundry goes to a variety of users; the principal casting applications include oil well equipment, trucks and trailers, textile machinery, farm implements, sugar refinery equipment and ordnance parts.

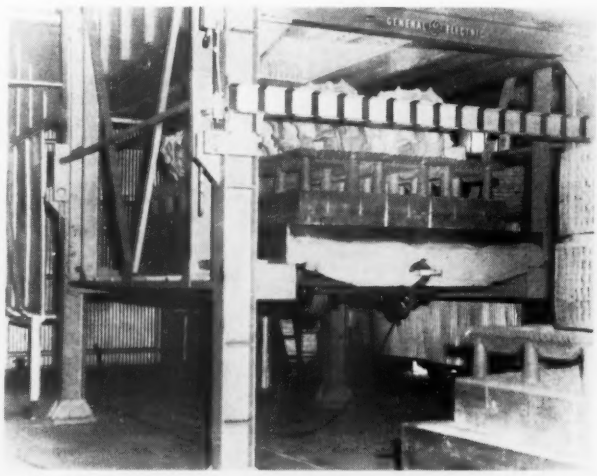
Hot metal is provided in the steel foundry by two electric arc furnaces. The larger of these produces a 4-ton heat, and the other is a basic-lined unit of 1-ton capacity used for special alloys.

Molding equipment includes a motive type sandslinger for floor work, a battery of 12 squeezer machines, and a cope and drag pair for production of relatively large molds involving fairly long runs. A 3000-lb capacity batch type sand mixer serves the steel foundry. Sand is moved in containers by lift trucks to the squeezer stations and by belt conveyor to the cope and drag machines. Molds from the latter unit are set out on roller conveyors for core setting, closing and pouring. Other molds are poured on the floor. A small but efficient coreroom, with electrically heated batch type ovens, handles the core requirements of the steel foundry.

Casting cleaning facilities consist of a shot blast room and an airless blast barrel, in addition to portable chipping and grinding tools.

The company is well equipped with heat treating units for processing both steel and Meehanite castings. Two electric, car type elevator furnaces are used for homogenization of steel castings and stress relief of Meehanite castings. One of these is $6\frac{1}{2}$ x $12\frac{1}{2}$ x $4\frac{1}{2}$ ft, the other $6\frac{1}{2}$ x $9\frac{1}{2}$ x $4\frac{1}{2}$ ft. Each will handle approximately a 10-ton load. A gas-fired muffle furnace, 20 x 36 x 10 in., also is available, in addition to quenching equipment.

Recent additions to the heat treating department are four electric pit type furnaces, two of them 42 in. and two 49 in. in diameter with a $7\frac{1}{2}$-ft



Elevator furnace for homogenization of steel castings and stress relief of iron castings

Magnetic particle inspection of steel castings is carried out with this portable unit

depth. An accompanying quench tank can recirculate 4000 gallons of water per minute and automatically maintains a temperature between 95 and 105° F. Careful inspection of all castings is supplemented by use of a portable Magnaflux unit for detection of surface cracks, as well as radiographic equipment for internal inspection. The latter includes a 250-kw x-ray machine and gamma ray equipment employing use of cobalt 60. The company was a pioneer among foundries in employing gamma ray inspection.

The iron foundry specializes in production of heat and wear resistant and pressure types of Meehanite castings in various grades, and also casts Ni-Hard and Ni-Resist. It pours castings up to a maximum of 10 tons in weight. A large part of the output is for machine tools and hydraulic equipment, involving relatively large castings. Approximately 15 to 20 per cent of the Meehanite castings made are given a stress relief heat treatment.

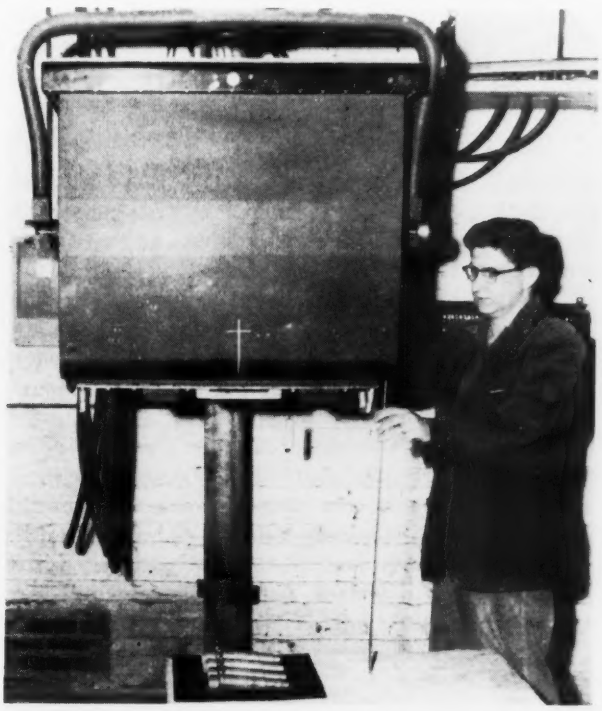
Production is diversified, involving few long runs. Pattern changes generally average 25 to 30 daily, and about 120,000 different patterns are in storage.

Melting equipment includes two 48-in.-diam mechanically charged cupolas, one being a water-cooled unit installed recently. Both are equipped with the so-called equi-blast arrangement to provide uniform air entry at the tuyeres.

The molding floor is equipped with a motive type sandslinger for ramming the larger molds, and a squeezer machine line. A new centralized sand preparation system, including storage bin and muller, was installed a short time ago to serve all molding departments.

Considerable cored work is involved in the iron castings, and core needs are supplied by both blowers and bench coremakers. Core baking equipment includes three batch type ovens, two car type ovens and a continuous tower unit.

A sizable portion of the foundries' production involves relatively complicated castings. Moreover, the company has (*Please turn to page* 164)



X-ray unit in operation. The foundry also uses gamma rays for inspection of castings

The plant's new and immaculate first aid room is directed by Mary Jane Graham, RN

Supervisors who participated in company's recent program of management development

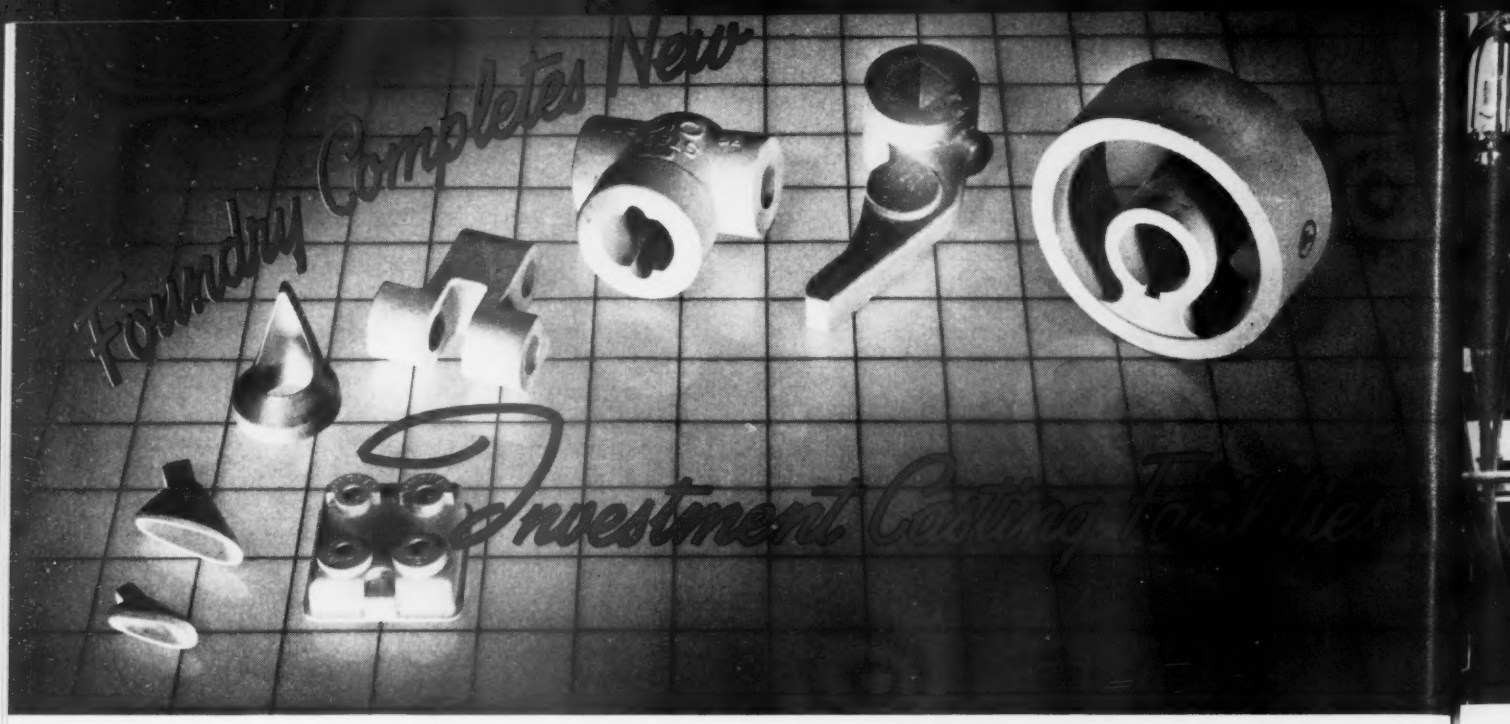


Fig. 1—Typical investment cast industrial applications. Grids form 1-in. squares

IN 1952, Howard Foundry Co., Chicago, purchased the investment casting business of the Allis-Chalmers Mfg. Co., Milwaukee. Last year the company acquired an industrial property at 5100 N. 33rd St., Milwaukee, and revamped and enlarged the building to house its expanded investment casting production. The company started moving into that plant in the fall of 1953 and recently completed the operation.

New construction has increased the floor area of the plant to about 65,000 sq ft. A second floor has been built over the original office building adjoining a 260-ft, two-story production bay. At the front end of that bay, covering about one-sixth of the floor area, a second floor has been built to provide space for new metallurgical and chemical laboratories, including x-ray, Zyglo, Magnaflux and inspection departments. The plant is of brick and steel construction, and about 30 per cent of the wall area is glass.

About 450 people are employed in the plant; previously there were 150. Almost 50 per cent of the total personnel are women, most of whom work in the wax injection or wax assembly departments. Additional facilities provide a production capacity five times that of the previous plant. Production currently is about 16,000 pieces a week.

A trip through this plant reveals the infinite detail and the many operations required to produce castings with over-all tolerances ranging from $\pm$ 0.003 to $\pm$ 0.008 in. per in. The casting operation proper starts with the production of wax pat-

Fig. 2—About 60 women are employed in wax pattern assembly, which is a manual operation. Inspector is stationed at end of each long table

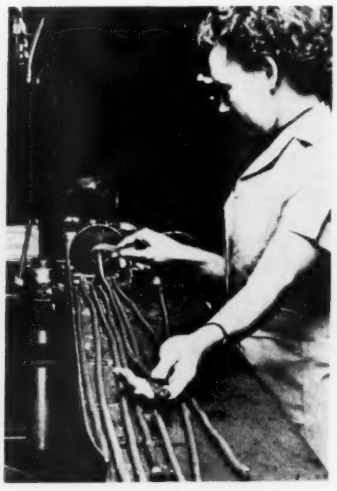


Fig. 3 — Patterns are gated with long, wax extrusions

Fig. 4—Sixteen automatic wax injection machines are used in pattern production room

terns. The pattern production room, Fig. 4, is equipped with 16 automatic wax injection machines of a new type which were designed by Howard engineers. The injection and pattern assembly rooms are air conditioned to maintain dimensional accuracy of wax patterns.

Wax temperature is controlled thermostatically, but temperatures can be changed to conform to the type of wax and the job being produced. A low-temperature wax may be held at 140 to 160° F and a high-temperature wax at 180 to 200° F. Range of wax pressure injection varies from 500 to 1000 psi, depending on the complexity of the die. Because hot wax and injection pressure heat up the dies, and especially cores which are almost entirely surrounded by hot wax, dry ice frequently is employed to keep such parts cool.

Since the new machines are entirely automatic in the injection cycle, the operator is responsible only for removing the dies from the machine,

Fig. 5—Operator needs only to remove, separate and assemble dies and to eject wax pattern

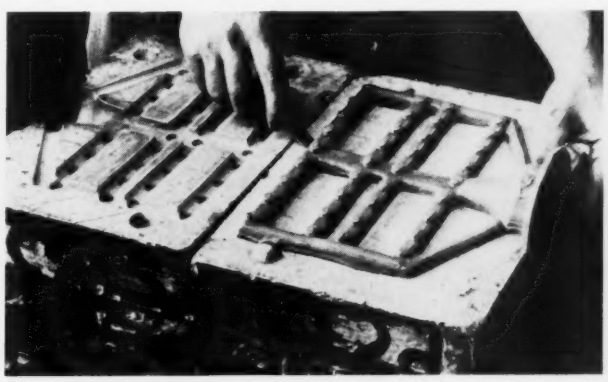


Fig. 6—Hydrocal "stone" book mold is separated to remove wax sprue. Mold halves are greased

Fig. 7—Wax patterns are joined to the sprues. In the foreground is a 25-gal wax holding tank

Fig. 8—After inspection, wax pattern assemblies are sent to primary investment department

Fig. 9—Stainless steel flask is bonded to bottom board with wax before secondary investment

Fig. 10—Secondary investment slurry is scooped out of blender in rear and poured into flasks

Fig. 11—Vibration table settles slurry, eliminates air bubbles, fills out assembly detail

Fig. 12—Wax is melted out or "lost" at 350°F in a 40-ft, continuous, conveyorized dewax oven

Fig. 13—Lost wax precision investment molds can be stored indefinitely in racks like these

separating and assembling the die and ejecting the wax pattern. The die, made of steel, is designed for fast opening, wax pattern ejection and assembly. Simplicity of the new machine is claimed to permit higher production and quicker training of operators.

Wax patterns are attached to wax sprues, which are molded in Hydrocal stone molds. These molds are produced in the plant's tool room. Fig. 7 shows the molds assembled for pouring with wax and the operators working on several sprue forms. The large tank in the foreground keeps 25 gal of wax in the liquid state. Fig. 6 shows the stone mold opened to remove the wax sprue. To facilitate removal of the wax sprues, mold surfaces are greased. Sprues are molded of wax collected from run-off pans underneath the dewax oven. Patterns always are made of new wax.

Long wax extrusions also are used to gate pattern assemblies and are produced when pressure is applied to a warm cylinder containing a 1-lb wax bar, as shown in Fig. 3. Smaller diameter extrusions than those illustrated can be obtained.

Assembling wax patterns or attaching a number of patterns to a single sprue requires a great amount of care and patience, since the work must be done by hand. About 60 women are employed in the wax pattern assembly. To speed up production, provide adequate lighting and permit efficient handling of materials, new production tables have been installed, as shown in Fig. 2. Two are 45 ft long, and one is 30 ft in length.

Wax patterns are attached to the sprues by means of heated tools. Frequently special fixtures are developed to speed this operation and to provide a greater amount of accuracy. In many cases a model of the assembly is placed in front of the operator so that there can be no mistake in the method of assembly. After the assembly has been completed, the gate of patterns is placed on a motor-driven conveyor belt running along the back of the longer tables, as shown in Fig. 2. Movement of the belt is controlled by an inspector stationed at the end. He checks, racks and transfers the assemblies to the primary investment department. (*Please turn to page* 230)

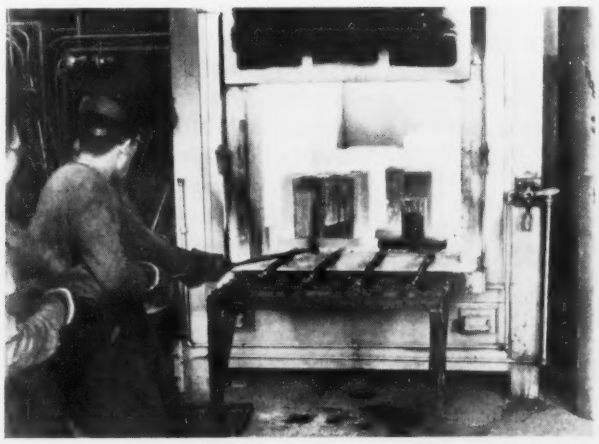


Fig. 14—In production bay, 13 gas-fired mold curing furnaces heat molds and volatilize wax

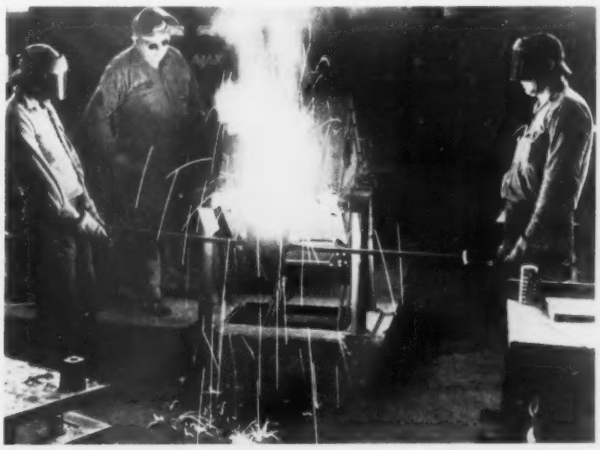


Fig. 15—Metal pouring temperatures range up to 3200 F. Two induction melting furnaces are used

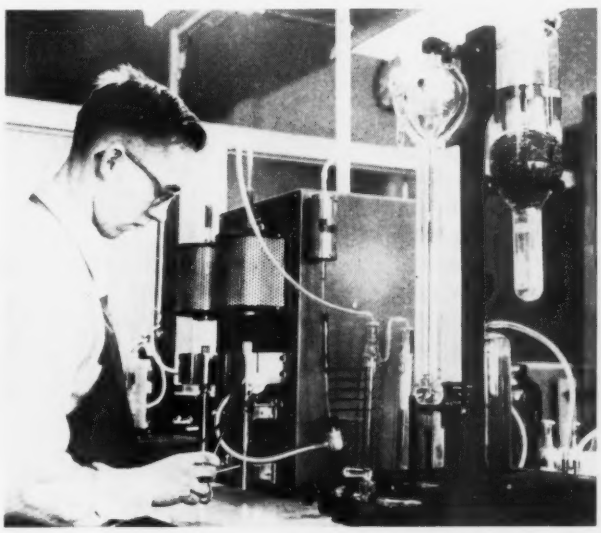


Fig. 16—Gas-o-metric determinator is one of many laboratory tools used to maintain quality

Fig. 17—High-speed friction band saw is used to cut the sprues and risers from the castings

QUESTIONS

Skilled woodworkers turned into patternmakers . . . .

Metal mold coating . . . . . Sand causes blow

Soil pipe and fittings . . . . . Aging of castings

Wants To Train Patternmakers

QUESTION We are up against a problem in training patternmakers on which we thought you might be able to offer us some assistance. Would you give us the titles and authors of any good manuals on patternmaking by which a skilled carpenter or cabinet maker could learn the fundamentals of patternmaking? Unfortunately, we have no trade schools in our Canadian city which teach the subject and we do not have a large enough staff to run an effective apprentice program of our own. Our line of castings does not call for any really complicated pattern work.

ANSWER Keeping in mind that the information sought is to be used by skilled carpenters or cabinet makers, we believe that the material would be of a related rather than practical nature since such men already possess some tool and machine skills of the pattern trade. It is necessary that these men become acquainted with the techniques of the foundry and coreroom, and that may be acquired through reading of pattern making and foundry books as well as the trade journals—and by visits to the various departments.

Other information includes learning about shrinkage of metal from its molten to solid state, the fact that it varies and the need for the use of different contraction or shrink rules to compensate for such shrinkage; the need for a pattern coating that does not add to pattern size, resists abrasion, and keeps moisture from the wood surface thereby avoiding swelling, warping and twisting; the construction of patterns and coreboxes, etc.

Books such as the following discuss the various questions mentioned:

Wood Patternmaking by H. McCaslin; Patternmaking by Joseph Skelly; Patternmakers Manual by American Foundrymen's Society; Manual of Foundry and Pattern Shop Practice by O. Benedict Jr.; Pattern Design by Hall and Kiley; Patternmaking by Ritchey, Beese and Hall; Practical Wood Patternmaking by J. Robert Hall; Text in Patternmaking by Hanel; Foundry Work by Stimpson, Gray and Brennan; Patternmaking and Foundry Units and Information and Operation Units in Machine Woodworking by R. E. Smith.

Those are a good sampling of reference books used in one trade school, and while none is complete in itself, all would be of value for the development program you have in mind.

Coating for a Permanent Mold

QUESTION We are pouring a copper casting of approximately 50 lb in a cast iron permanent mold. Casting is gated from the bottom at one end of the mold with a single sprue and is working very nicely except that we have not been able to find a satisfactory mold coating. We will appreciate your recommendation in this matter. Coating may be either sprayed or brushed on, and can be renewed after each cast if necessary. We will appreciate immediate attention as we are nearing a deadline and must improve the finish of the casting.

ANSWER Unfortunately you did not describe the nature of the finish or, rather, the defective finish; the difficulty may be due to something other than the mold coating itself. Trouble may arise from the way in which the coating is applied, or perhaps it may be due to the method of gating. By that we refer to the large quantity of metal at fairly high temperature flowing over one area. That creates a hot spot on which it is difficult to maintain a proper coating.

As you undoubtedly know, a number of proprietary mold coatings on the market are being employed successfully, and many firms which formerly made their own coatings have turned to them. In general, these coatings are composed of some type of refractory such as kaolin clay, whiting, alumina, talc, etc. suspended in water with or without addition of sodium silicate to aid in suspension. In addition, finely divided graphite or rouge may be added.

If you want to try your hand at making a mold coating we suggest one composed of 1 gal water at the boiling point to which 12 oz of 40 per cent sodium silicate, 10 oz whiting and 1 oz graphite or rouge is added. Solution is cooled before use. Since the particulate matter in the mold wash or coating tends to settle out on standing, the solution should be stirred well prior to use.

We believe that spraying the coating is preferable to brushing since only a thin coat is desired on the mold face, and better adhesion is obtained. Mold should be at an elevated temperature when the coating is applied, but the mold should not be so hot as to cause steam bubbles. Coating may be rubbed down with steel wool, but do not get the coating too slick since the metal will not lie on it properly. Thicker coatings usually are applied in the gate section and other areas where a slower cooling rate is desired.

Classifies Defect as a Blow

QUESTION We are sending for examination a small gray iron casting showing a small blow or shrink which is causing many rejections. We will appreciate how this would be classified and the cause. Casting is all in the cope side with the stem uppermost, and four pieces are made in a mold. Iron shows 2.45 to 2.60 per cent Si, 0.56 to 0.65 per cent Mn, 0.10 to 0.14 per cent S, 0.10 to 0.18 per cent P, and 3.35 to 3.40 per cent TC. Sand properties show 100 to 110 permeability, 2.5 to 3.0 per cent moisture and 10 to 11 psi green compression strength.

ANSWER As you indicate, the position of the defect in the casting apparently could lead to classification as either a shrink or blow. However, sectioning the casting

through the area involved, to permit closer examination of the structure of the metal and the exterior surfaces, leads to the opinion that the defect is a blow and not a shrink. This is based on the fact that the metal beneath the indentation or depression is solid, and the exterior surface has a dull, bluish cast associated with steam or water vapor and hot metal—and numerous sand grains were found embedded in the metal at the bottom of the depression.

While you did not state specifically, we suspect that this defect occurs in the same spot which is formed by a small pocket of sand. That pocket develops a nasty little re-entrant angle which is difficult to vent satisfactorily, even with a sand of good permeability. A stop-gap remedy would be to run a vent wire through the sand at the point involved, but the proper remedy, of course, is to eliminate the re-entrant angle by putting a little more metal in the area. Experimentally you could place wax in the area, and contour it so that smooth curves similar to those on adjoining parts of the casting are obtained.

Makes Soil Pipe and Fittings

QUESTION Could you give us information on how soil pipe and fittings are molded and cast? We would like to know about coring such work and the range of analysis permissible in such castings. Are there any particular books on making soil pipe and fittings? Also would like details on gating and risering those castings.

ANSWER While from time to time articles have been published on different phases of production of soil pipe and fittings, we do not know of any book on the subject. Soil pipe is made in three classes —standard, medium and heavy. Standard is $\frac{1}{8}$-in. thick, medium is 3/16-in. and heavy is $\frac{1}{4}$-in. thick. Major production is in the standard class. Average analysis for such castings would show 1.75 to 2.00 per cent Si, 0.75 per cent P, 0.45 to 0.50 per cent Mn, and 3.40 to 3.50 per cent TC.

Detailed explanation of the manufacture of soil pipe and fittings would take considerably more space than is at our disposal, and we can only provide a brief summary. Unless cast in centrifugal machines, the long straight lengths in either bell and spigot or two bell ends are made in close-fitting cast iron or steel flasks. Pipe up to 6 in. diam are mounted in pairs, and over that size, singly. Sprues and gates usually are arranged to take metal from a large elongated, multi-lip ladle suspended from a crane or monorail. Central runner between two castings feeds thin flat gates spaced about 2 in. apart. Four sprues equidistantly spaced lead to the runner.

Practice in preparing the molds varies. In some plants the pattern is dropped part way through a stripping plate before the half mold is lifted. In others the half flask is lifted directly from the rigid pattern and plate. A small fillet at the joint line insures a clean lift, and a vibrator attached to the plate is kept in operation during the lift.

Cores for the pipe are made on cast iron or steel pipe arbors with numerous closely-spaced vent holes. Ends of the arbors are machined and fit closely in a circular opening in each end of the flasks. Finely screened sand for the cores is stored in an overhead hopper. The arbors are clay-washed or dipped in water, and placed on a stand under the hopper. Stand is provided with bearings corresponding to the turned ends of the arbors. A crank handle for hand work or a simple type of clutch for mechanical handling is fitted to one end to revolve the arbor while a thin stream of sand falls from the overhead hopper. A flat knife or doctor resting on the stand regulates the thickness of sand on the arbor and imparts the correct shape and smoothness. Cores are not coated, and are used green.

Molds for pipe fittings are made similar to straight pipe — that is, on a jolt machine or rammed by hand. Cores for the castings generally are rammed by hand. An arbor, which may be plain or a backbone with a number of semi-circular wings cast on, occupies space in the lower half of the corebox. Corebox is in halves which may or may not be hinged. For some shapes a shell pattern serves for pattern and corebox. The pattern is split horizontally through the center. On cores provided with three or more bearing points, short core prints are sufficient. On bent pipes with only two bearing points it is necessary to prolong the bearings and arbor ends to resist the lift of the metal as it flows into the mold.

Discusses Aging of Castings

QUESTION We are interested in obtaining information on whether you know of any books or published articles dealing with "aging" and its causes and effects in gray cast iron.

ANSWER By aging we assume that you are referring to the old practice of exposing castings to the atmosphere for several months before machining them. That procedure was followed since it appeared that better dimensional stability resulted than when the castings were machined without such "weathering" or "seasoning." L. M. Sherwin in *Transactions* of the American Foundrymen's Association, 1917, (now society) in discussing "seasoning" stated: "Castings which have not been heat treated and are left for a long period of time in the yard exposed to the weather are found to be seasoned to an extent about equal to that which the castings receive from heat treatment."

However, P. A. Russell in *Foundry Trade Journal*, Sept. 5, 1946 carried on some work with test castings designed to incorpor-

ate stresses, and found that such castings exposed four months to varying atmospheres and temperatures showed only a reduction of internal stresses of about 15 per cent. Machining of the specimens also provided some stress relief. Study by C. R. Tottle, *Proceedings*, Institute of British Foundrymen, 1947-48 indicated that weathering relieved stresses to an appreciable extent, and M. M. Hallett, *Foundry Trade Journal*, Aug. 11, 1949 set the figure of 10 per cent maximum stress relief on aging at room temperature for several months.

Aging or weathering is not practiced to any great extent today. In the first place, it means a large inventory of castings, and secondly a short heat treatment at 950 to 1050° F for plain gray irons and somewhat higher for alloy-type irons will provide up to 80 per cent stress relief, as pointed out in two articles by C. O. Burgess in the August and September, 1953 issues of FOUNDRY.

Make a Study Before Changing

QUESTION We are in charge of the technical and control laboratory of the municipal transport system of a large South American city operating nearly 2000 busses and streetcars, and have our own foundry for producing repair and other castings. At present we produce monthly about 5000 cast iron brakeshoes weighing about 83 tons, 800 bronze bushings and bearings weighing 22,000 lb, 800 bronze trolley wire fasteners weighing 1320 lb, and around 4400 lb of 14-in. bronze bushings from 1 to 7 in. in diam. These are made on molding machines, and molds are poured twice a week. We would like to change the first-mentioned bushings and bearings to centrifugal castings, and the wire fasteners and last-mentioned bushings to shell molding. We would like to have your opinion on this matter, considering our needs.

ANSWER Before making any changes in procedure it always is advisable to make a careful study of present practice to ascertain the piece cost of casting as it leaves the foundry, and in your case—since you machine some of the castings—the final cost as placed in use. Then the same type of study should be made of the proposed method. From such data you can determine which will be more economical. As you undoubtedly know, proper cost estimation involves consideration of a large number of factors, including cost of equipment, interest and depreciation. In addition, you should consider machining costs, since saving there may overshadow differences in molding costs.

As far as feasibility of producing the bushings and bearings by centrifugal casting is concerned, we agree that it is a logical procedure, but it is not quite clear to us why you consider making some by shell molding. We would use the centrifugal casting method for all of them. The trolley wire supports could be made by shell molding.

Painting a Foundry Building

QUESTION We have an all-steel prefabricated foundry building constructed in 1949. The siding is corrugated galvanized steel sheets and the steel frame work has had only the ground coat that was put on at the factory. Please advise the kind of paint to use and also preparation of the surface before painting the entire building both inside and outside. Also advise concerning kind of paint and preparation of the surface for painting our cupola, cupola house and equipment.

ANSWER Procedure for painting the inside and outside will differ because the outside has been exposed to the weather. For painting the inside surfaces of the galvanized sheets it will be necessary to prepare the surface by cleaning with naphtha or other solvent to remove dirt and grease on the surface (Observe fire hazard rules). Chemical washes may also be used. If the inside has been painted previously, it should be wire brushed to remove loose paint and rust.

New galvanized iron is a difficult surface to paint because of a progressive reaction between the zinc surface and the paint film which eventually destroys the bond of paint to metal. A special primer containing finely divided zinc will be required as it adheres well to galvanized iron. After the primer coat has been applied a linseed oil graphite type paint, an outside house paint or an aluminum paint may be used, as preferred.

To paint the outside it will be sufficient to prepare the surface by scraping and wire brushing to remove loose paint and rusted areas. A primer containing zinc chromate, red lead, zinc oxide and iron oxide should be used. The final coat may be the same as that used on the inside.

The paint required for the cupola, cupola house and equipment depends upon the temperature to which these parts are subjected. Assuming that the temperatures are low, the following procedure can be used: Clean the surfaces of all foreign matter by use of the methods described previously. Use the outside primer described above for a prime coat and the first coat. For the second and third coats use the linseed oil graphite type paint or an aluminum paint. On areas not exposed to the weather the first coat may be omitted.

For detailed information or for conditions where high temperatures or corrosive atmospheres are a problem we suggest that you consult any reputable paint manufacturer.

Arsenic Addition to Copper

QUESTION Would you please tell us how we can add 1 per cent arsenic to copper, and what precautions should be taken? We have oil-fired pit furnaces and use crucibles. We intend making castings about 1 x 1 x 6 in.

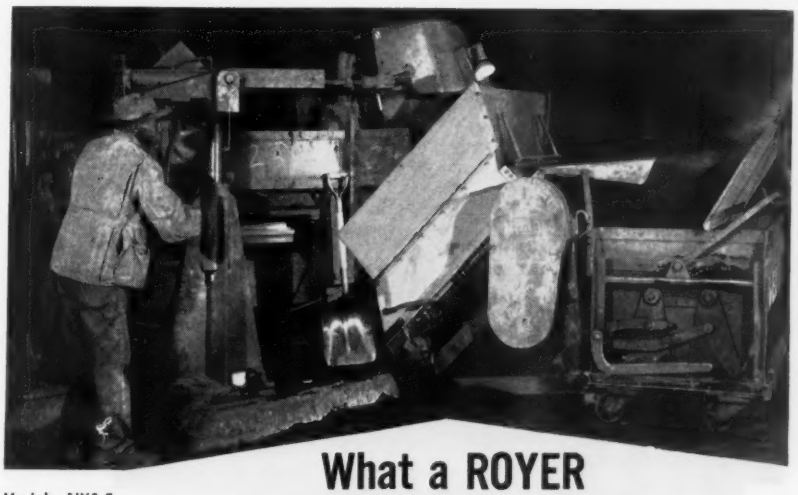
ANSWER While we have heard of arsenical copper in wrought form for staybolts, locomotive firebox plates, etc., we do not recall deliberate addition for castings. Arsenic usually is added to wrought copper for the purpose of increasing its resistance to temperature since it inhibits recrystallization. Amount commonly is limited to 0.5 per cent, and such arsenical copper usually is called "firebox copper." Since the purpose of arsenic addition is to improve resistance to recrystallization, we can see no reason for its presence in copper castings because they are not subject to that phenomenon unless they are worked in some fashion.

Addition of arsenic is a hazardous process since the fumes are highly poisonous, and should not

(*Concluded on page* 102)

MULLING IS ONLY HALF THE JOB---

Finish it with a ROYER



Model NYS-E with a 9 ft. muller.

What a ROYER will do for your Mulled Sand

1. Increase permeability.
2. Increase flowability.
3. Eliminate all clay balls.
4. Provide a final complete mixing.
5. Double aerate the sand.
6. Speed cooling by fluffing, open discharge stream and open heap.
7. Assure a light, fluffy texture.

A Model NRS in a Massachusetts foundry.

The mulling operation, designed to coat sand grains with certain additives by the mechanical process of kneading, is an essential one for good sand control. However, this action results in pressing and packing the sand grains together and the added bonding materials tends to hold the sand in a dense state. Sand properly prepared for molding should be open and fluffy, to allow for good flowability and the escape of gases. Sand discharged from ANY muller needs to be aerated . . . with a ROYER . . . the only machine large enough to handle the instantaneous discharge from large mullers; the only machine which fluffs and cools as it aerates.

Install a Royer directly under your muller discharge or later in the system, if more convenient. Two models are recommended for this application, depending upon capacities desired—the NRS, 40 to 60 tons per hour or the NYS, 120 to 180 tons per hour. With the addition of a Royer no time is added to the cycle of sand preparation and, for a fraction of a cent per ton, the quality of your sand will be improved many times over. Write for complete details.

Foremost in Sand ROYER *Conditioning Equipment*

ROYER FOUNDRY & MACHINE CO. 159 PRINGLE ST. KINGSTON, PA.

(*Concluded from page* 100)

be attempted by the average foundryman. In commercial manufacture of a 30 per cent arsenic-copper master alloy, the arsenic is placed with copper in a sealed retort in a well-ventilated furnace and enclosure. Since such a master alloy is available we suggest you obtain some and add it to your copper—3 lb 5 oz of the master alloy and 96 lb 11 oz of copper. This should give about 1 per cent As content.

However, since arsenic fumes will be given off during melting and pouring, every precaution should be exerted to see that the operators are well protected. Melting and pouring should be conducted under hoods suitably ventilated to the outside of the foundry, and the operators should wear gas masks equipped with filtering agents specifically for removal of arsenic fumes.

Designates Scrap Metal Types

QUESTION Where can we obtain specifications for the following cupola melting scrap materials, similar to those under which prices of foundry materials and coke are listed in FOUNDRY: No. 1 cupola cast, clean auto cast, machinery cast, and short steel rails? These are for use of our purchasing department.

ANSWER According to the Institute of Scrap Iron and Steel, 1729 H St. N.W., Washington 6, the following information applies:

Cast Iron No. 1 (Cupola cast). Clean cast iron scrap such as columns, pipes, plates and castings of miscellaneous nature, including cast parts of agricultural machinery. Must be free from stoveplate, burnt iron, brake shoes and foreign material. Must be cupola size, not over 24 in. by 30 in., and no piece to weigh over 150 lb.

Clean Auto Cast. Clean auto blocks; free from all steel parts except camshafts, valves, valve springs and studs.

Drop Broken Machinery Cast. Clean heavy cast iron machinery scrap that has been broken under the drop. All pieces must be in cupola size, not over 24 x 30 in., and no piece to weigh over 150 lb and not less than 5 lb.

Cut Rails, 3 ft and under (AAR No. 28-A). Cropped rail ends 3 ft and under in length. Free from concrete, dirt and other foreign materials.

Cut Rails, 2 ft and under (AAR No. 28-B). Cropped rail ends 2 ft and under in length. Free from concrete, dirt and other foreign materials.

Cut Rails, 18 in. and under (AAR No. 28-C). Cropped rail ends 18 in. and under in length. Free from concrete, dirt and other foreign materials.

Softer Core Prevents Cracks

QUESTION Many of our brass bushings develop cracks when they are machined. Metal is melted in a crucible oil-fired furnace. The mixture includes borings of unknown zinc content, copper and red brass scrap. A considerable amount of manganese bronze is mixed with the metal and we have been told that the aluminum content of this metal may be responsible for the cracks. However, the castings crack sometimes when no aluminum is present in the charge.

ANSWER Since the castings are circular, the cracking probably may be controlled by using a softer core. With a green sand core the center may be cut out with a sprue cutter. Dry sand cores should be as soft as possible; this is accomplished by using a minimum amount of binder. In both cases the resistance to the contracting metal is reduced to a minimum. The metal is unusually weak while passing from the liquid or pasty to that of the solid state. In this condition the slightest resistance has a tendency to break or crack the casting.

Operation of Permanent Molds

QUESTION We are contemplating production of castings by the permanent mold method, and would like to know the common method in practice to maintain the temperature of the mold at 600 to 700° F. Is a heat indicator used on the mold? Also where can we obtain mold coating materials? Could we make our own, and if so what could we use?

ANSWER Permanent molds usually are raised to the operating temperature by the use of simple gas burners (pipes pierced with holes) designed to provide uniform heating over the mold surface. After the temperature is reached, the control essentially is regulated by the operating cycle—that is, the number of castings made in a given period, and that will have to be determined by making experimental runs.

If the mold tends to run too hot the castings take too long to solidify—the mold will have to be cooled externally by use of air blast or fan, or application of ribs or studs on the back of the mold to provide greater heat radiating surface. Conversely, if the mold runs cold, heat will have to be applied with the gas burner.

Mold coatings may be obtained from manufacturers and foundry supply houses whose names and addresses may be found in the advertising pages of FOUNDRY. While we believe that you will obtain better results by purchasing the coating, you probably will not be satisfied until you experiment. Therefore, you might try the following: Heat 30 gal of water to boiling and stir in 7 qt of 40 per cent sodium silicate (water glass). Then add 10 lb of whiting, and follow with 1 lb of rouge or graphite. Allow to cool before use, but stir well previous to application to the mold face since the solids tend to precipitate.

Coating Patterns with Metal

QUESTION We are interested in the purchase of aluminum paint that hardens the surface of patterns, and would like to know where it may be obtained.

ANSWER From your reference to hardening the surface of a pattern, presumably wood, it occurs to us that you are interested in a coating of metallic aluminum as such and not in the form of paint.

Metallic aluminum is applied by a method known commonly as metallizing. The molten aluminum or other metal in the form of finely divided droplets, is sprayed onto the surface of the object to be coated. On striking the object the droplets solidify and adhere strongly, forming an almost impervious, continuous metallic coating. The process is used to apply metallic coatings to wood patterns, but its greatest use is in applying protective metal coatings to other metals and to build up worn areas.

"Never mind that fancy sales talk. Just tell me this: what will **THIEM CORE & MOLD COATINGS & CORE OILS** do for me?"

That's a good question. We'll let the **THIEM** *twins answer it.*

- **FERRO-KOTE**
- **KROME-KOTE**
- **NO-DRI**
- **MOLD-LITE**
- **ZIRCON COATINGS**
- **CHILL KOTE**
- **MUDDING COMPOUND**
- **INGOT KOTE**
- **CORE OILS**
- **CORE-HESIVE CORE PASTE**

SOLD WITH SERVICE

An honest question deserves an honest answer. THIEM CORE & MOLD COATINGS & CORE OILS will cut your costs, speed operations and eliminate mixing errors. Why? Well, foundrymen agree that foundry operations require products that are unquestioned in *quality*, unquestioned in *uniformity*. We'll grant that all reputable suppliers furnish such products. BUT—a product that goes great guns in one foundry may cause nothing but trouble in another. Because of these differences, THIEM *custom-fits* its products to your way of doing things. THIEM CORE & MOLD COATINGS & CORE OILS are uniform, high quality, laboratory controlled, sold with service—and tailor-made for you.

Thiem
PRODUCTS, INC.
Best BY Test
Milwaukee 14, Wisconsin

MEN OF INDUSTRY

MARSHALL POST
. . . leaves Birdsboro Steel

GEORGE LAMBERT
. . . IBF secretary

DR. AUGUSTUS B. KINZEL
. . . director of research

PETER E. KYLE
. . . v.p., engineering firm

MARSHALL POST has retired as vice president in charge of operations, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., following over 50 years in the steel industry. In 1900 he joined American Steel Foundries, Granite City, Ill., as a molder's helper, and three years later became a molder at Commonwealth Steel Co., now General Steel Casting Corp., Granite City. He returned to American Steel Foundries and was general foreman there in 1918 when he became foundry superintendent, Marion Steam Shovel Co., Marion, O. In 1920 he was made works manager, Sharon Works, American Steel Foundries, and in 1923 was sent to its Thurlow Works in Chester, Pa., as works manager. He joined Birdsboro in 1925 as works manager, and while there helped to develop the Randupson process of cement molding. Mr. Post was national president of the American Foundrymen's Society in 1938-39.

♦ ♦ ♦

Thomas Drever, chairman of the board, American Steel Foundries, Chicago, recently received an honorary doctor of laws degree from Illinois Institute of Technology. Mr. Drever is a trustee of the institute and chairman of its finance committee. He is board chairman, Griffin Wheel Co., Chicago, and a director of Griffin Steel Foundries Ltd., Quebec, and Diamond Chain Co., Indianapolis.

♦ ♦ ♦

J. K. Bell has been appointed head of the nondestructive testing department, Sam Tour & Co., New York. Mr. Bell was graduated from New York University and has been engaged in erection and design of power and chemical plants.

George Lambert has been appointed secretary of the Institute of British Foundrymen, succeeding the late Tom Makemson. Mr. Lambert has been assistant secretary of the institute since 1947. He was educated at the Central School of Commerce, Newcastle-on-Tyne and had his early industrial training at R. & W. Hawthorn, Leslie & Co. Ltd.'s Locomotive Works, Newcastle-on-Tyne. In 1931 he was appointed chief assistant to the secretary of the Institute of Marine Engineers, London, resigning in 1947 to join the Institute of British Foundrymen.

♦ ♦ ♦

Dr. Augustus B. Kinzel has been appointed director of research, Union Carbide & Carbon Corp., New York. Dr. Kinzel received degrees from Columbia University, Massachusetts Institute of Technology and the University of Nancy, France, and has been actively engaged in research work with Union Carbide since 1926, most recently as vice president of Electro Metallurgical Co. He is vice president of the American Institute of Mining and Metallurgical Engineers and is active in various other technical societies.

♦ ♦ ♦

Ralph R. West, president, West Steel Casting Co., Cleveland, was recently elected president, Cleveland Engineering Society, for 1954-55. Mr. West served as president of the society last year also.

♦ ♦ ♦

H. E. Martin has been elected president and a director of Metal & Thermit Corp., New York. Mr. Martin had been with the Babcock & Wilcox Co. since 1929, most recently as manager of the New York district.

Peter E. Kyle, since 1946 professor of metallurgy, College of Engineering, Cornell University, has resigned to become vice president of Lessells & Associates Inc., Boston, in research and development covering mechanical engineering, electronics and mathematical physics. While a student engineer at Westinghouse Electric Corp., Mr. Kyle attended Carnegie Institute of Technology's evening courses. He was graduated from Cornell University in 1933 and received his master's degree from Massachusetts Institute of Technology in 1939. In 1943-44 he was granted leave from teaching duties at MIT to serve with the War Metallurgy Committee's Product Research Division. Mr. Kyle has been active in committee work with the American Foundrymen's Society and Foundry Educational Foundation.

♦ ♦ ♦

E. J. Tribble has been appointed assistant vice president-manufacturing, Worthington Corp., Harrison, N. J. **A. M. Tullo** has succeeded Mr. Tribble as manager of the Harrison Works. **L. E. Hammer,** formerly assistant manager at the Wellsville, N. Y., Works, has assumed Mr. Tullo's former post as Wellsville works manager.

♦ ♦ ♦

Gifford V. Leece, since 1947 vice president-sales manager, has been elected president, Gardner-Denver Co., Quincy, Ill. Since he joined the company in 1922, Mr. Leece served as manager on the Pacific Coast and as sales manager of oil field products. In 1938 he became New York City division manager and organized the export division there. **Benjamin C.**

(*Continued on page* 106)

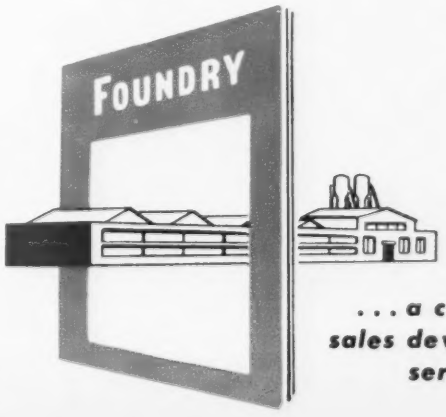
Foundry's PLUS 5 SERVICE

will help move your products

What is PLUS 5? It's your key to more business from foundries.

It gives every FOUNDRY advertiser a bonus he can get from no other source. Here is help in analyzing this market—studying sales territories and potentials—planning the sales effort—and creating a constructive promotion program to the 5 billion dollar foundry market.

It's time to take a new look at this market—and at the unusual selling aids we have for you. Say PLUS 5 to your FOUNDRY representative and he'll show you this 5-step program designed to move more of your products into foundries.



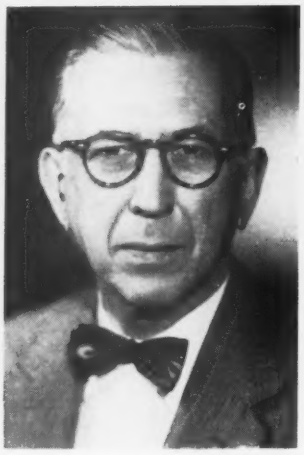
More than a magazine . . .

. . . a complete sales development service

FOUNDRY • Penton Bldg. • Cleveland 13, Ohio

MEN OF INDUSTRY

RICHARD W. HACKETT
. . . joins U. S. Graphite



HAROLD W. PARTHEMER
. . . assistant manager, I-H

OTTO A. KRUEGER
. . . department manager, I-H

JAMES R. ALLAN
. . . leaves Harvester company

(*Continued from page* 104)

Essig, since 1938 vice president in charge of the Denver plant, has been made Gardner - Denver's executive vice president. A graduate of Colorado School of Mines, he joined the company in 1923, and later served as manager in Birmingham and St. Louis. He was manager of mining and construction division sales, and in 1938 was made vice president in charge of the Denver plant.

♦ ♦ ♦

Richard W. Hackett has joined United States Graphite Co., Saginaw, Mich., to handle sales in Davenport, Iowa, Moline and Rock Island, Ill., with headquarters in Davenport. Mr. Hackett was graduated from Hillsdale College and also attended University of Toledo.

♦ ♦ ♦

Ernest V. Piazza has been transferred from the Cincinnati district sales office of the Whiting Corp., Harvey, Ill., to the St. Louis district office. Mr. Piazza, a chemical engineer, has been sales engineer in the Cincinnati district for seven years and with Whiting for twelve years. **Charles D. Schmidt** has been assigned to the New York district sales office. A graduate of the University of Illinois, Mr. Schmidt previously served in engineering capacity in the Foundry Equipment Division, Harvey, Ill. **A. C. Patsavas** has been assigned to the Cincinnati district sales office. He was graduated from Illinois Institute of Technology in 1950 and has been with Whiting since that time. **Bernard L. Heinen** has been assigned to the Houston, Tex. district office after extensive training with Whiting Corp. for the last four years. Mr. Heinen was graduated from Illinois Institute of Technology in 1950.

♦ ♦ ♦

James R. Allan, since 1946 manager of the industrial engineering and construction department, International Harvester Co., Chicago, has retired following 44 years with the company. Mr. Allan joined the company after receiving his engineering training at Lewis Institute. He was assistant superintendent in charge of the malleable foundry, McCormick Works, later transferring to the industrial engineering department of the Harvester company. Active in committee work of the American Foundrymen's Society, he is also a former director of that organization. Recently he served as chairman of the AFS Safety, Hygiene and Air Pollution Steering Committee. **Otto A. Krueger,** with the company since 1916, has succeeded Mr. Allan as manager of industrial engineering and construction, and **Harold W. Parthemer,** formerly construction engineering consultant, has become assistant manager, the position formerly held by Mr. Krueger.

♦ ♦ ♦

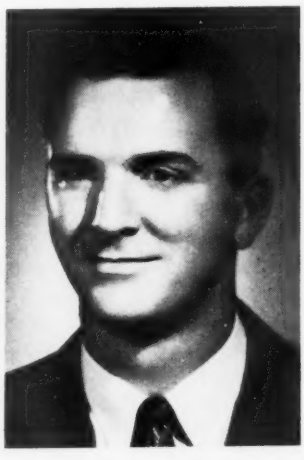
D. F. McCandlish has been appointed regional manager of the north central region, Air Reduction Sales Co., Division of Air Reduction Co. Inc., succeeding **S. H. Newburn,** who was recently appointed president of Air Reduction Canada Ltd. Mr. McCandlish joined Airco in 1931 and was most recently manager of the Chicago district. **S. S. Bruce Jr.,**

(*Continued on page* 109)

A. C. PATSAVAS
. . . Whiting Cincinnati sales

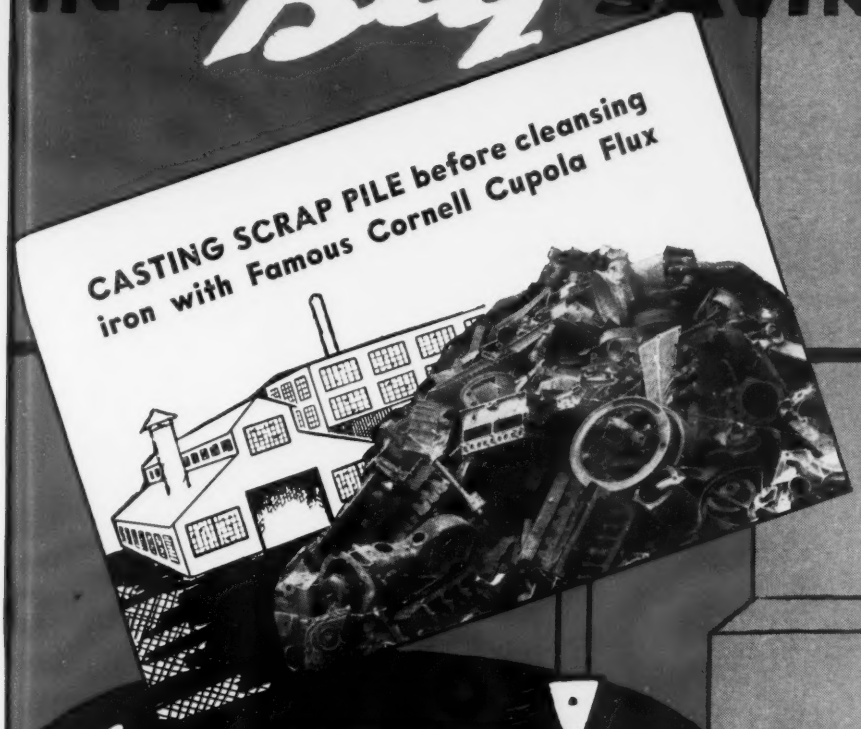
CHARLES D. SCHMIDT
. . . New York sales, Whiting

ERNEST V. PIAZZA
. . . Whiting sales, St. Louis

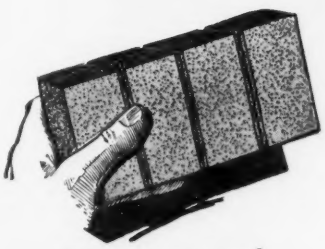


BERNARD L. HEINEN
. . . Houston sales, Whiting

Interested IN A Big SAVING?



Famous CORNELL CUPOLA FLUX CONDITIONS IRON FOR BETTER CASTINGS



pre-measured
SCORED BRICK FORM

MOLTEN IRON IS THOROUGHLY CLEANSED IN THE CUPOLA, FLUIDITY IS INCREASED AND SULPHUR GREATLY REDUCED

A new era in casting production began over thirty six years ago with the introduction of Famous Cornell Cupola Flux to minimize casting rejects and scrap loss.

That our goal has been achieved, is evident by the hundreds of leading gray iron foundries and malleable foundries with cupolas, on our list of regular customers.

The value of using Famous Cornell Cupola Flux with each charge of iron is clearly revealed by cleaner, sounder castings.

Famous Cornell Cupola Flux greatly reduces cupola maintenance by keeping cupolas cleaner. And by forming a glazed or vitrified protective surface on brick or stone, reduces erosion and repairs.

Scored Brick Form adds to ease in fluxing a charge of iron, saves time and avoids waste.

WRITE FOR BULLETIN NO. 46-B

The Cleveland Flux Co.

1026-1040 MAIN AVENUE, N. W., CLEVELAND 13, OHIO

Manufacturers of Iron, Semi-Steel, Malleable, Brass, Bronze, Aluminum and Ladle Fluxes – Since 1918

FAMOUS CORNELL FLUXES
Trade Mark Registered

BRASS FLUX

FAMOUS CORNELL BRASS FLUX cleanses molten brass even when the dirtiest brass turnings or sweepings are used. You pour clean, strong castings which withstand high pressure tests and take a beautiful finish. The use of this flux saves considerable tin and other metals, and keeps crucible and furnace linings cleaner, adds to lining life and reduces maintenance.

ALUMINUM FLUX

FAMOUS CORNELL ALUMINUM FLUX cleanses molten aluminum so that you pour clean, tough castings. No spongy or porous spots even when more scrap is used. Thinner yet stronger sections can be poured. Castings take a higher polish. Exclusive formula reduces obnoxious gases, improves working conditions. Dross contains no metal after this flux is used.

(Advertisement)

What it takes to make a 3000 Degree Refractory Concrete

Because of the widespread interest in the use of refractory castables, many furnace operators have asked us for the story behind the performance of B&W's unique refractory concrete, Kaocast.

Here are the answers to some of the most frequently asked questions:

Q. *When you refer to Kaocast as a 3000 degree refractory castable, do you mean that its melting point is 3000° F?*

A. No, this means that its service use limit is 3000° F; its melting point is 200 degrees higher.

Q. *Just what does it take to make a 3000 degree refractory castable like B&W Kaocast?*

A. Let's first define a few terms. Refractory castables are made with granular materials which are volume stable at high temperatures and which can undergo repeated heating and cooling cycles without disintegration. These materials, known as refractory calcines or grogs, are blended with suitable hydraulic binders. The initial strength of a refractory castable is thus developed in the same manner as that of ordinary concrete—that is, through the chemical action between water and the binder. A strong *ceramic bond* is formed when the refractory castable is subjected to temperatures above the vitrification point.

Q. *Then you have a grog, a binder and a method of putting them together. Which is most important?*

A. You can't say that any *one* is most important. It's a combination of all three. Let's take them one at a time. Our grog consists primarily of the proper blend of kaolin and other alumina-silica materials. This ratio enables us to achieve a grog with minimum expansion and shrinkage, a high fusion point, and greater stability under load, at varying temperatures.

Q. *And now, what about the binder?*

A. There are a number of factors responsible for the success of the Kaocast binder. One is the compound Tricalcium Penta-aluminate (3 lime to 5 alumina). This formula produces the most refractory compound (highest melting point) that can be made from lime and alumina. Another is that by using the purest commercially available lime and alumina, the Kaocast binder is substantially free of iron and silica. Such traces of these that are present combine during the prefiring of the binder to produce stable compounds.

Q. *Just how important is the manufacturing or "blending" of the grog and the binder?*

A. If one factor could be singled out as "most important" it would be quality control.

Direct control over the fineness of materials, prefiring temperatures, and other phases of manufacture is possible at B&W because both the grog and the binder are made and blended at B&W's Augusta Works—under B&W's direct control and supervision.

Q. *These factors you've discussed must add up to some specific advantages of Kaocast. What are they?*

A. B&W Kaocast has all the advantages of easy installation which are responsible for the widespread interest in refractory concretes, plus these exclusive features: It is the only 3000 degree refractory concrete with high resistance to spalling and low volume change throughout its operating range.

THE BABCOCK & WILCOX CO.
Refractories Division
General Offices:
161 East 42nd St., New York 17, N. Y.
Works: Augusta, Ga.

JOHN L. GOHEEN
. . . Brake Shoe casting sales

WILLIAM N. HULME
. . . Brake Shoe sales

GEORGE B. COALE
. . . division manager, Baroid

JACK J. FRIEDMAN
. . . heads Brass Founders

(*Continued from page* 106)
zone manager, eastern region of Air Reduction's railroad department, succeeds Mr. McCandlish as Chicago district manager.

♦ ♦ ♦

William N. Hulme has been appointed district sales manager of brake shoes, and **John L. Goheen,** district sales manager of castings, Brake Shoe & Castings Division, American Brake Shoe Co., New York. Mr. Hulme joined the company in 1938 and Mr. Goheen in 1943. Both men will have headquarters in San Francisco. **John F. Ducey,** vice president of the division, has been transferred from San Francisco to New York.

♦ ♦ ♦

Arthur L. Pierce recently retired as general manager and secretary-treasurer of the American Emery Wheel Works, Providence, R. I., following 46 years with the company. Following officers have been appointed: **Frederick J. Darby,** president-works manager; **Harold O. Skoog,** vice president-ceramic engineer; **Torrey Allen,** treasurer-general manager; and **William W. Turner,** secretary-sales manager. **John A. Doherty** has been appointed abrasive engineer for Rhode Island and adjacent Massachusetts territory.

♦ ♦ ♦

Herbert W. Rogers was recently elected president, Lithium Corp. of America, Minneapolis, succeeding the late Karl M. Leute, founder of the company. **Charles S. Bellows** succeeds Mr. Rogers as secretary, and **Samuel H. Rogers** was named a director.

♦ ♦ ♦

Harry E. Case, formerly sales engineer in the Philadelphia office, Dravo Corp.'s Machinery Division, has been appointed division sales engineer in the company's Pittsburgh home office.

George B. Coale has been appointed general manager of the Baroid Sales Division, Houston, Tex., National Lead Co., New York, succeeding **George L. Ratcliffe,** who will continue as vice president of the parent company and will remain active in Baroid sales. Mr. Coale was graduated from the Naval Academy in 1927 and joined National Lead Co. in 1935. At the time of his appointment as assistant general manager of Baroid in 1949, he was chief engineer for National Lead Co.

♦ ♦ ♦

Semon H. Stupakoff has been elected vice president, the Carborundum Co., Niagara Falls, N. Y., where he will direct activities of Stupakoff Ceramic & Mfg. Co., Latrobe, Pa., recently acquired and made a Carborundum Co., division. Mr. Stupakoff was formerly president of the ceramic company which his father founded.

♦ ♦ ♦

John W. Frazier has been named field manager, American Air Filter Co., Louisville, with headquarters in Pittsburgh, where he will work with the company's national district sales offices. For the past 7 years Mr. Frazier has been associated with Trion Inc., McKees Rocks, Pa.

♦ ♦ ♦

Edward G. Cahill, formerly personnel and industrial relations manager, Aluminum Co. of America's Cleveland works, has been named assistant district sales manager in Cleveland. Mr. Cahill has been branch manager at the company's Syracuse, N. Y., sales office.

♦ ♦ ♦

J. D. Webster, since 1951 sales engineer in General Electric's Apparatus Division, San Francisco, has been appointed manager of industrial and non-allied sales, X-ray department, Milwaukee.

Jack J. Friedman, vice president-production, Bronx Brass Foundry Inc., Bronx, N. Y., was recently re-elected president of Metropolitan Brass Founders' Association. A graduate of Polytechnic Institute of Brooklyn, in 1947 he joined Bronx Brass, which his father helped to organize in 1914.

♦ ♦ ♦

Thomas W. Teetor has been appointed foundry engineer, Federal Malleable Co., Milwaukee. Mr. Teetor worked at the Cleveland, Columbus and Ashtabula, O., plants of Columbus Malleable Iron Co., following graduation from Purdue University in 1948. Three years later he became associated with Swayne, Robinson & Co., Richmond, Ind., where he was development engineer.

♦ ♦ ♦

Eugene Worell and **James R. Fleming** have been appointed sales representatives, Bohn Aluminum & Brass Corp., Detroit. Mr. Worell, a graduate of University of Minnesota, will work out of the St. Louis office. He was previously with Manitowoc Co., Manitowoc, Wis. Mr. Fleming was graduated from University of Michigan, and will have his headquarters in Bohn's Dayton, O., office.

♦ ♦ ♦

George Heard has been appointed Pittsburgh district sales and service manager of Dravo Corp.'s heating department there, to supervise sales and service of its equipment in the Pittsburgh and Tri-State areas. A graduate of Yale University, Mr. Heard has been with the department for 7 years.

♦ ♦ ♦

H. R. Salisbury has retired as president, Air Reduction Sales Co., New York, but will continue as a director of Airco's foreign subsidiaries. **J. H. Humberstone** has succeeded Mr. Salisbury as president of the sales company, and will continue as vice president, Air Reduction Co., a position

he has held since 1951. He joined the company in 1948 as manager of the apparatus production. Mr. Humberstone is also president-board chairman, Arcrods Corp., an affiliate. **R. E. Lenhard** has succeeded him as president of the Ohio Chemical & Surgical Equipment division of Airco in Madison, Wis.

♦ ♦ ♦

David Clark Jr., new chairman of the Northeastern Ohio Chapter of the AFS for 1954-55, is plant manager, Forest City Foundries Co., Cleveland. Mr. Clark was born and educated in Scotland and has been with the company since going to Cleveland in 1929. He is chairman of the operator's group, Gray Iron Research Institute, Columbus, O. He was vice chairman of the chapter last year.

DAVID CLARK JR.
. . . NEO chapter chairman

EDWIN A. SWENSSON
. . . Herman Pneumatic sales

W. E. WATSON
. . . works manager FM&Co.

R. H. MORSE III
. . . Fairbanks-Morse sales

♦ ♦ ♦

O. V. Tally has been appointed director of industrial sales, general machinery division, Allis-Chalmers Mfg. Co., Milwaukee. Other division appointments include **J. S. Morgan,** director of utility sales, and **W. L. Manly,** director of general purpose equipment sales. **J. H. Burrus Jr.** has succeeded Mr. Tally as manager of the Midwest region. **M. M. York** has been named manager of the Northwest region, and **John E. Smet** succeeds Mr. York as New England regional manager.

♦ ♦ ♦

J. Arthur MacMillan, formerly superintendent, Jackson Iron & Steel Co., Jackson, O., has been appointed general superintendent of the Blast Furnace and Electric Furnace Divisions, Globe Iron Co., there. Mr. MacMillan was previously with Crucible Steel Co. of America in Midland, Pa.

♦ ♦ ♦

Charles L. Homer, vice president, North American Smelting Co., Wilmington, Del., was recently named executive vice president. Mr. Homer joined the company in 1946, following termination of duty with the WPB, as chief of the Brass Mill Division. He is currently a member of the Commerce Department's advisory board serving the brass and bronze ingot industry.

♦ ♦ ♦

Edwin A. Swensson has been appointed sales and service engineer in Michigan and adjacent cities in Ohio and Canada by the Herman Pneumatic Machine Co., Cleveland. Mr. Swensson also represents National Engineering Co., Chicago, and Carl-Mayer Corp., Cleveland, in that area. Mr. Swensson studied at Illinois Institute of Technology.

♦ ♦ ♦

W. L. Ashlock and **H. F. Grote,** who have been sales representatives for the Metals Division, Olin Industries Inc., East Alton, Ill., have been appointed regional sales managers. Mr. Ashlock will be located at the company's New Haven, Conn., plant, and Mr. Grote has been assigned to Cleveland. **E. M. Grady** has been made customer service manager at the division's headquarters in East Alton, and **E. R. Hack** has been named to the same position in New Haven, Conn.

♦ ♦ ♦

John Glasrud has been appointed technical supervisor of barrel finishing research, Minnesota Mining & Mfg. Co., St. Paul. Mr. Glasrud, who has been technical supervisor of the roofing granule research laboratory, has been with the company 7 years.

♦ ♦ ♦

Charles R. Wirth has been named district representative, Eclipse Fuel Engineering Co., Rockford, Ill., for the company's recently opened West Coast district office, listed as Industrial Combustion & Furnace Co., Glendale, Calif. Mr. Wirth was previously sales engineer for Eclipse in the Rockford area.

♦ ♦ ♦

William E. Eccles has been appointed foundry superintendent, Cooper-Bessemer Corp., Grove City, Pa.

♦ ♦ ♦

R. H. Morse III has been appointed assistant to the vice president-sales, Fairbanks, Morse & Co., with headquarters in Chicago. He joined the company 8 years ago following Navy service. **W. E. Watson** has succeeded Mr. Morse as general manager of the Beloit, Wis., works. Since January, 1953 Mr. Watson has been works manager of Canadian Locomotive Co. Ltd., Kingston, Ont., company affiliate. In 1943 he became manager of the St. Louis Works, three years later was transferred to Chicago as manager of the Pump Mfg. Division, and later became assistant to the vice president-manufacturing.

♦ ♦ ♦

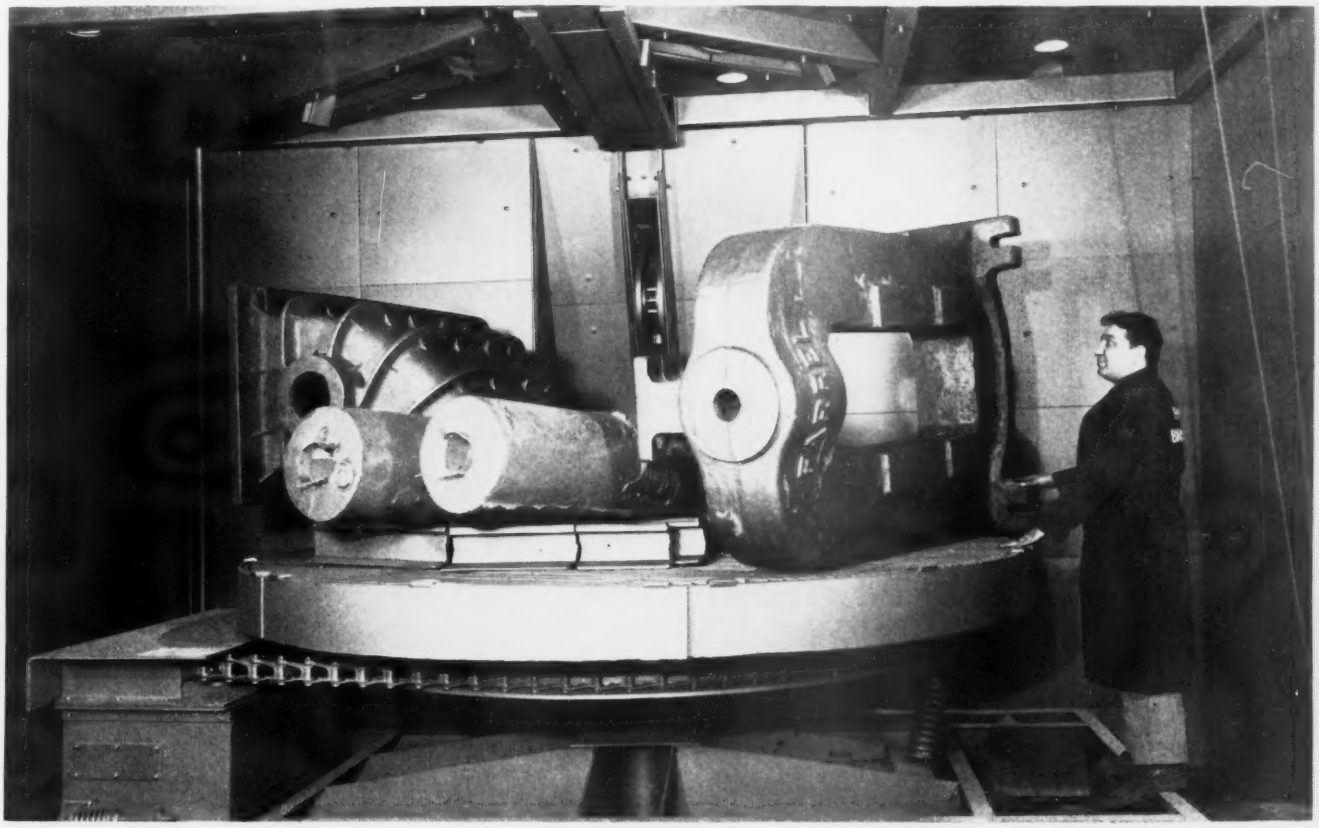
A. J. Tomasek, formerly executive vice president, Walsh Refractories Corp., St. Louis, has been elected president. **J. J. Duggan,** manager, glass refractory sales, and **W. K. Schweickhardt,** manager, refractory sales, have been named vice presidents. **Paul L. Hershfield** continues as board chairman, and **T. W. Gill** was re-elected secretary-treasurer.

♦ ♦ ♦

Harris C. Miller, sales representative in the New York district, Hooker Electrochemical Co., Niagara Falls, N. Y., has been named assistant sales manager of that district. Mr. Miller joined the company in 1941 following graduation from Worcester Polytechnic Institute. **Dr.**

(Concluded on page 112)

pioneering developments keep **WHEELABRATOR** ® *first in blast cleaning*



SIZE Is No Obstacle To Cleaning Economy

Wheelabrator Room reduces time and money in cleaning castings at Farrel-Birmingham Co., Inc.

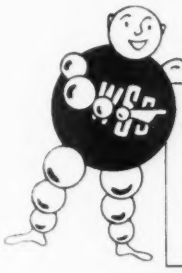
If the cleaning of your large, bulky and heavy castings is a time-consuming, laborious and costly operation, you can profit from the experience of Farrel-Birmingham Co., Inc., Ansonia, Conn. An old airblast room had formerly been used for the cleaning of castings. Cleaning time was excessive, quality of cleaning unsatisfactory and costs were naturally high.

This picture has been changed with the installation of a Wheelabrator Car-Type Room, utilizing three airless Wheelabrator units. Whereas two shifts had formerly been necessary to maintain their daily cleaning work schedule, only one is now required. Drastic reductions in cleaning time on individual castings has enabled this time-and-labor-saving.

A 17,000 lb. iron casting, for example, is now cleaned in one hour and 12 minutes—5½ hours had formerly been required. The table load, pictured above, weighing about 10 tons was completely cleaned in just 26 minutes—four hours of airblasting was the former time standard. Castings weighing up to 10 tons are regularly handled. In many cases cleaning time has been reduced as much as 75%.

A unique feature of this Wheelabrator Room is the provision made in the cabinet for air blast cleaning castings weighing up to 80 tons and 10′ high by 14′ wide by 48′ long in size. A separate work car is provided for handling these extremely large pieces.

Regardless of the size or weight of the castings you produce, a Wheelabrator Room can be designed to provide you with similar cleaning performance. Write today for Bulletin No. 854 to see typical machine designs Wheelabrator engineers have perfected for solving complex cleaning problems.

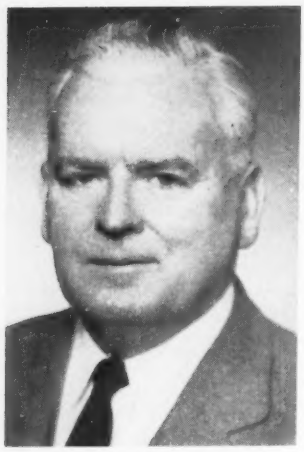


Wheelabrator Steel Shot assures lowest overall cleaning costs. Write for Bulletin No. 89-A.

American
WHEELABRATOR & EQUIPMENT CORP.
505 S. Byrkit St., Mishawaka, Ind.

Wheelabrator®
AIRLESS BLAST CLEANING

Manufacturers and Selling Agents: CONTINENTAL EUROPE—George Fischer, Ltd., Schaffhausen, Switzerland; BRITISH COMMONWEALTH—Tilghman's Patent Sand Blast Co. Ltd., Broadheath, England; JAPAN—Tokyo Boeki Kaisha, Tokyo; BRAZIL and ARGENTINA—Equipamentos Industriais EISA Ltda., Sao Paulo, Brazil; AUSTRALIA—McPherson's, Melbourne; MEXICO—Casco, S. De R. L., Mexico, D. F.



ROSSER L. WILSON
. . . American Brake Shoe v. p.

JOHN BERMINGHAM
. . . AFS chapter chairman

(*Concluded from page* 110)

Frank W. Long has been transferred from the research and development department to the sales department.

♦ ♦ ♦

Rosser L. Wilson, since 1949 chief engineer, Brake Shoe & Castings Division, American Brake Shoe Co., New York, has been appointed vice president-engineering. Mr. Wilson was graduated from Purdue University and joined the company in 1935, becoming assistant chief engineer in 1937. **Robert B. Pogue** has retired as vice president-engineering and is being retained as a consulting engineer for the division. He joined the company in 1916 and became chief engineer in 1937, vice president-engineering in 1949.

♦ ♦ ♦

John Bermingham, recently elected president, Northern California Chapter of the AFS for 1954-55, for the past 18 years has been associated with E. F. Houghton Co., San Francisco, and for 4 years has been special foundry service engineer for the company's western division. Mr. Bermingham was graduated from California School of Mechanical Arts and prior to joining the Houghton company was engaged in drafting, purchasing, sales management and production fields. He was vice chairman of Northern California Chapter last year and is a past director, secretary and chairman of the local chapter of American Society for Metals.

♦ ♦ ♦

W. H. T. Furry has been named director of the Training and Educational Division, Foxboro Co., Foxboro, Mass., succeeding **Malcolm B. Hall,** who has spent 40 years with the company. Mr. Furry joined the company in 1952. **K. A. Bell,** associate director of training, will assist Mr. Furry.

♦ ♦ ♦

Robert A. Foley has been named district salesman, Lindberg Engineering Co., with headquarters in the Chicago home office. Mr. Foley, for 20 years with Hevi Duty Electric Co., for 6 years was in its Jersey City, N. J., office, and was Chicago district manager for 18 months.

♦ ♦ ♦

C. J. Schmidt, for 20 years manager of the Detroit office, J. O. Ross Engineering Corp., has been named vice president-sales, with headquarters in the company's main office, New York. A graduate of University of Wisconsin, Mr. Schmidt joined the Ross organization in 1930.

♦ ♦ ♦

George J. Fisher has been appointed director of the metallurgical department, Sam Tour & Co. Inc., New York. Mr. Fisher was graduated from the Polytechnic Institute of Brooklyn with a master's degree in metallurgical engineering. He previously was metallurgist, General Electric Co.

♦ ♦ ♦

F. H. Atwood, vice president, Harbison-Walker Refractories Co., Pittsburgh, was re-elected president of the Refractories Institute. **F. H. Laube Jr.,** executive vice president of Freeport Brick Co., Freeport, Pa., was elected treasurer.

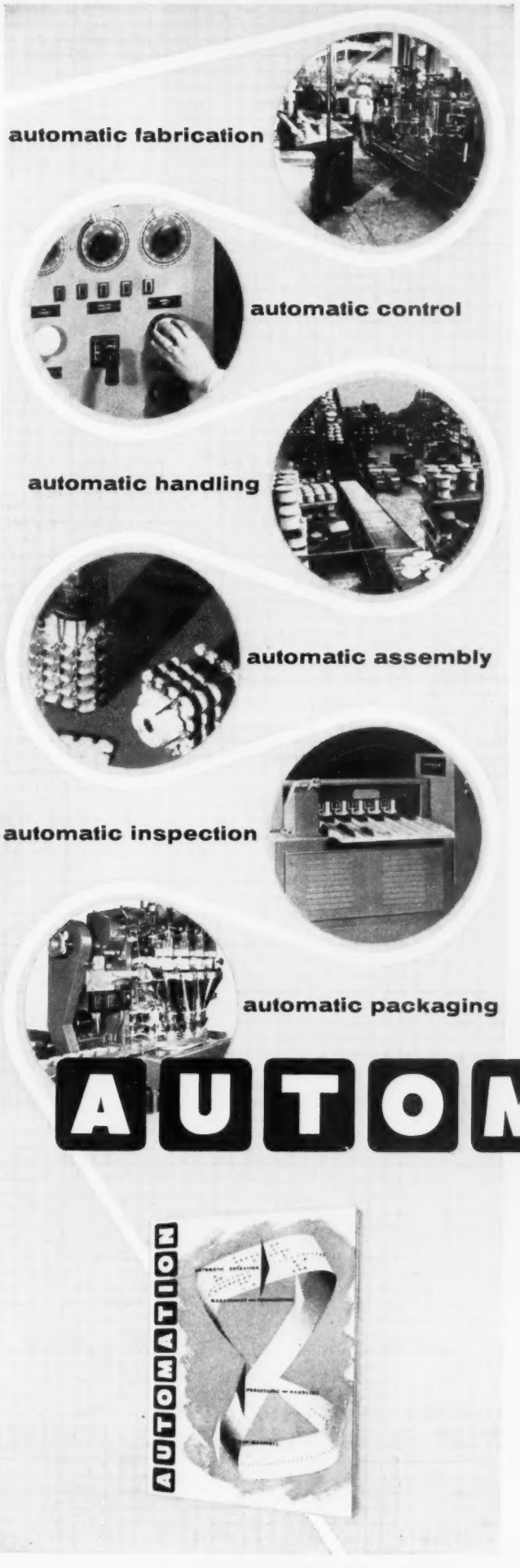
♦ ♦ ♦

John D. Spalding, works manager, National Supply Co., Torrance, Calif., was recently presented a merit award by the Merchants and Manufacturers Association, Los Angeles, for meritorious achievements in employee-company relations.

♦ ♦ ♦

Gen. Hermon F. Safford, president, Ohio Rubber, Willoughby, O., division of Eagle-Picher Co., Cincinnati, has been named a director of Osborn Mfg. Co., Cleveland.

RECEIVES ALUMNUS AWARD: Dr. Milton S. Eisenhower, president of Pennsylvania State University, State College, Pa., presented the university's 1954 Distinguished Alumnus Award to William B. Wallis, right, president, Lectromelt Furnace Corp., Pittsburgh, on June 12 in recognition of Mr. Wallis' work in developing and introducing the electric furnace in the production of special alloy steel. The citation named Mr. Wallis "a leader in one of the outstanding industrial advances of our time." Mr. Wallis was graduated from the university in the class of 1911



new ways of doing things
automatically-
a challenge to every
industrial operation

a challenge

—to management and engineering executives in all industry who must make more goods, for more people, at lower cost.

A challenge, too, to the executives in companies making products that must be made more automatic. And finally a challenge to consulting engineers recommending and specifying machines and equipment for automatic operations.

The answers to help meet this challenge will be found in the pages of the *one* magazine dealing solely with all manner and method of automatic operation. It is the first and only magazine to examine automatic operation whenever, wherever and however it may appear.

AUTOMATION

A new Penton monthly magazine packed with practical information about automatic operation. First issue out in August. Look for it!

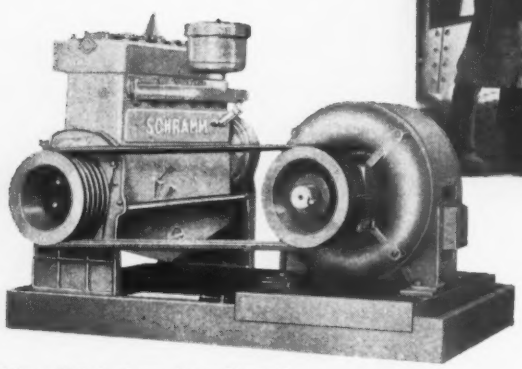
PENTON BUILDING · CLEVELAND 13, OHIO

NYB&P Sand Suction Hose quickly moves hot or cold sand, resists abrasive wear.

Don't compromise — get the special foundry belting & hose you need!

Resistorip® construction quickly ejects imbedded metal, prevents destruction of conveyor belts by ripping.

For sand-blasting rough castings, you can't beat Double Diamond Sand Blast Hose.



Gilmer V-Belts have the pull—and the endurance—to keep air compressors on the job!

IN ADDITION to its multi-lived shakeout belts, with exclusive rip-checking "RESISTORIP" construction, New York Belting & Packing Co. serves the modern foundry with many other top-quality rubber products, including:

CONVEYOR BELTING—for any material, hot or cold.

TRANSMISSION BELTING—flat, V-belts and "Timing"® belts.

HOSE—air, paint and lacquer spray, sand blast, sand suction, water, steam, etc.

There's no need to compromise on inefficient, general-purpose hose or belting! Every NYB&P product is engineered for its specified service, using the most suitable fabrics, rubber compounds and manufacturing processes to produce the ultimate in satisfaction and durability. Rely on your nearby NYB&P Distributor for the best . . . and most economical in the long run! If he is not listed in your local classified directory, write to address below.

Gilmer "TIMING" BELT DRIVES AND V-BELTS

NYB&P INDUSTRIAL RUBBER PRODUCTS

NYB&P — NEW YORK BELTING & PACKING CO. (founded 1846)

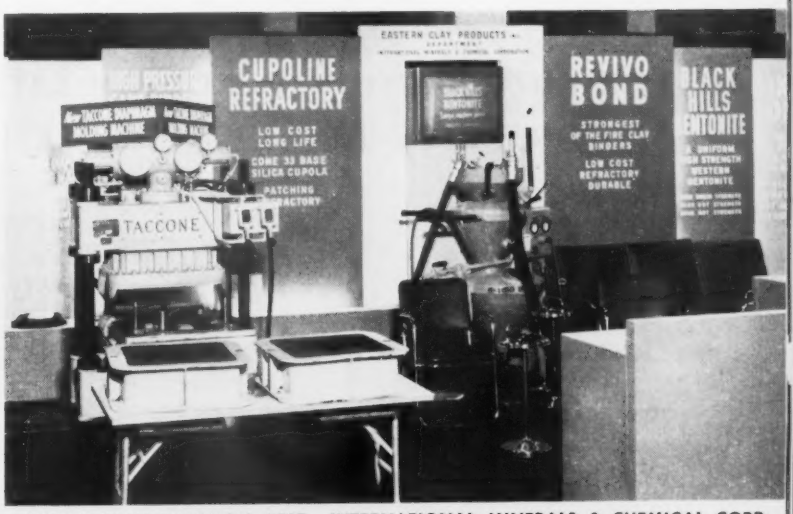
NEW YORK BELTING & PACKING CO. 1 Market St., Passaic, N. J.

America's Oldest Manufacturer of Industrial Rubber Products

Seen at the FOUNDRY SHOW

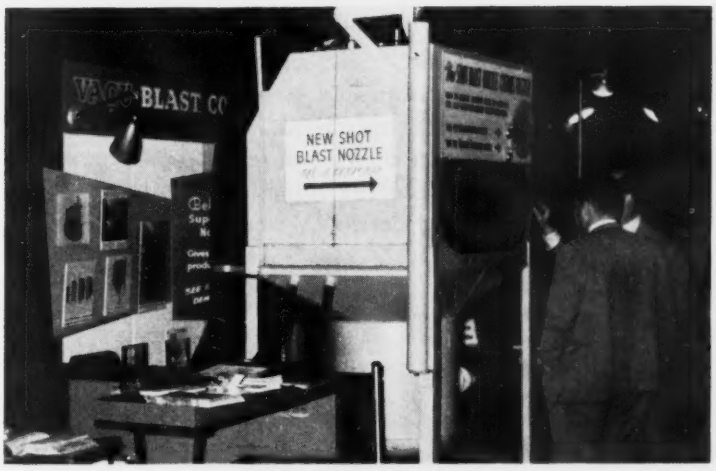
Here and on following pages are additional views of exhibits at the AFS Foundry Show in Cleveland. Booths of a number of other exhibitors were shown in the July issue

U. S. HOFFMAN MACHINERY CORP.



EASTERN CLAY PRODUCTS DEPT., INTERNATIONAL MINERALS & CHEMICAL CORP.

PYROMETER INSTRUMENT CO. INC.



VACU-BLAST CO. INC.

R. LAVIN & SONS INC.

LOBDELL UNITED CO.

Let's talk sense about t

FOR AUTOMATION OR MODERNIZATION . . . YOU NEED MOLDING MACHINES DESIGNED TO HANDLE VARYING PRODUCTION REQUIREMENTS

THE problem of achieving greater economy and efficiency in the face of rising costs must be met by every foundry according to its specific requirements. For some, the answer lies in *automation* . . . the use of fully automatic machinery and systems which can operate with minimum supervision and human effort. For others, whose plant size and production volume do not permit the use of complex coördinated equipment, the solution is *modernization* . . . the replacement of obsolete models with improved machines engineered for efficient low-cost operation.

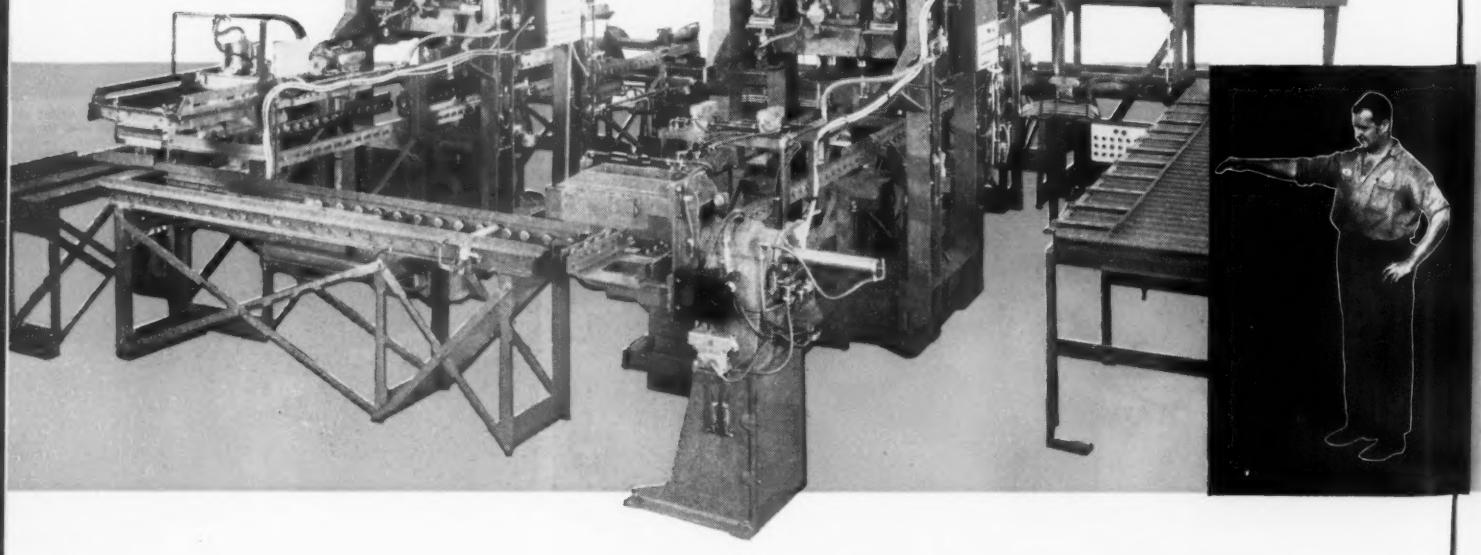
Whether your foundry is ready for automation or a modernization of its existing facilities, SPO builds the molding machines you need for higher production at lower cost.

. . . IF YOU'RE READY FOR COMPLETELY AUTOMATIC MOLDING

As the first practical automatic molding unit, the SPOMATIC has made complete automation possible in the foundry. This unit provides the most efficient, economical and high-speed method of "hands-off" production molding available today. Once a SPOMATIC is started, all operations are fully automatic, mechanical and continuous.

All SPOMATIC installations are engineered to individual production requirements. Capacities of the various integral components can be widely varied. In addition, each machine's versatility is controlled by the flask size specified and the variety of molds possible within that size.

SPOMATIC is the trend-setting molding machine designed to bring automation to foundry operations . . . to make the "foundry of the future" a reality today! Write for Bulletin "MM" for additional details.



From the smallest to the largest . . . there's a SPO for every molding job

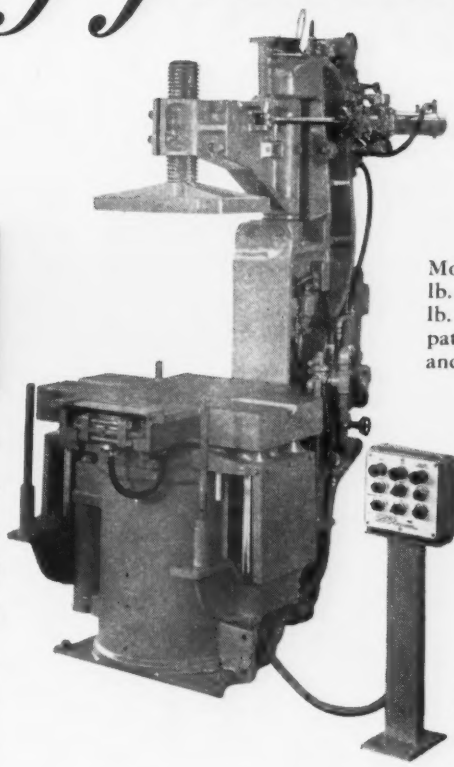
SP

the changing foundry

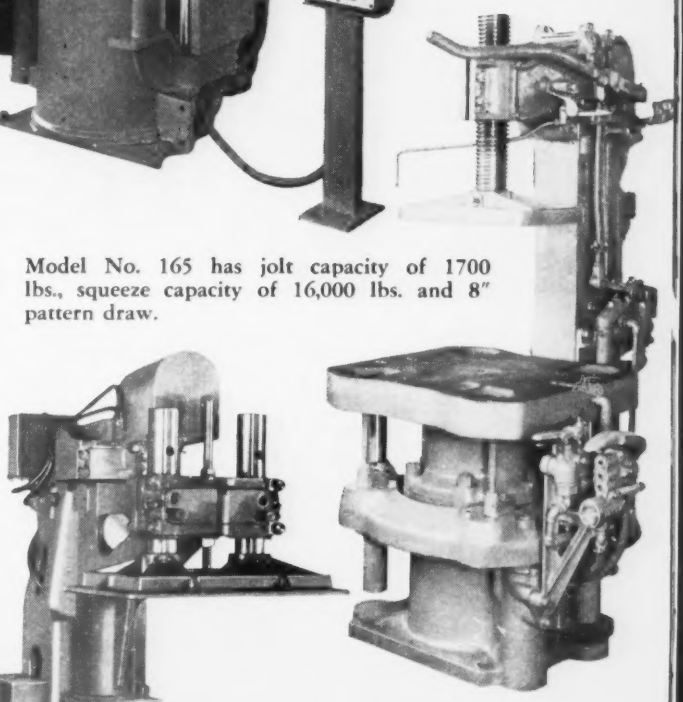
. . . IF YOU'RE GOING TO IMPROVE EXISTING FACILITIES

SPO produces a complete line of molding machines to meet every foundry's needs . . . both for jobbing and mass-production operations. Ranging from small manually-operated units to semi-automatic pushbutton giants, SPO machines are engineered for safe, economical, high speed operation and the production of uniform standard molds. Most of these versatile machines feature the patented "inverted jolt" mechanism, which assures maximum efficiency and service life with minimum maintenance. All SPO units are shipped complete with necessary valves, controls and lubrication fittings. Only an air line need be attached for operation. To meet individual needs, a variety of accessory items also can be supplied for many types of SPO machines.

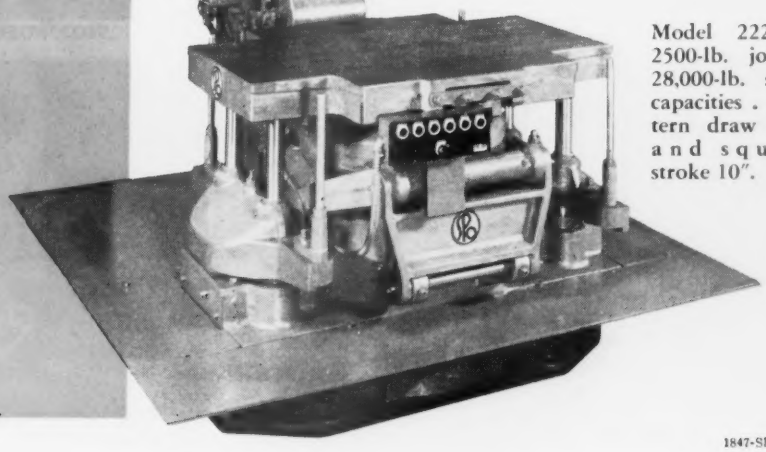
The SPO molding machines illustrated on this page are only a few examples of types and sizes available today. Write for new 8-page bulletin for additional details.



Model 2160-C has 1500-lb. jolt capacity, 16,000-lb. squeeze, adjustable pattern draw (6 to 10") and 12" squeeze stroke.



Model No. 165 has jolt capacity of 1700 lbs., squeeze capacity of 16,000 lbs. and 8" pattern draw.



Model 2222 has 2500-lb. jolt and 28,000-lb. squeeze capacities . . . pattern draw is 12" and squeeze stroke 10".

WORLD'S LARGEST SUPPLIERS SPO OF MOLDING MACHINES

1847-SI

SPO INCORPORATED 6449 GRAND DIVISION AVE. • CLEVELAND 25, OHIO

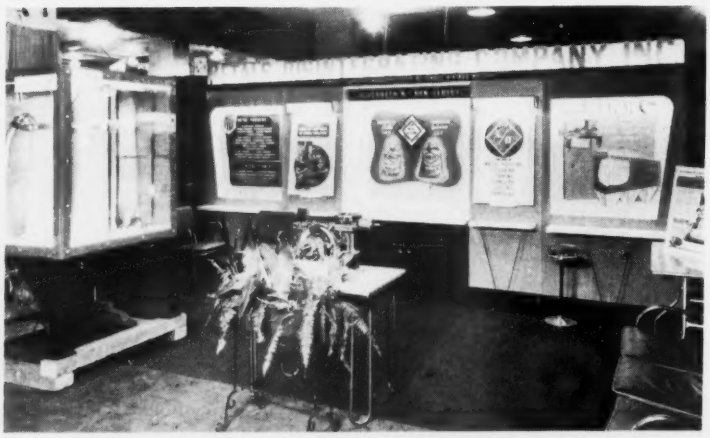
ADAMS CO.

FEDERAL FOUNDRY SUPPLY CO.

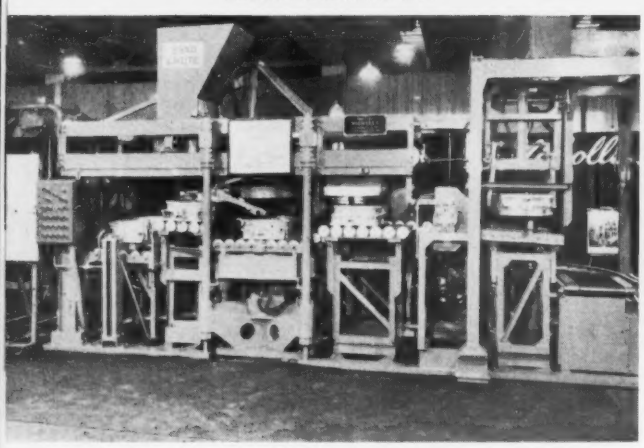
HARDY SAND CO.

DUREZ PLASTICS & CHEMICALS INC.

JAEGER MACHINE CO.

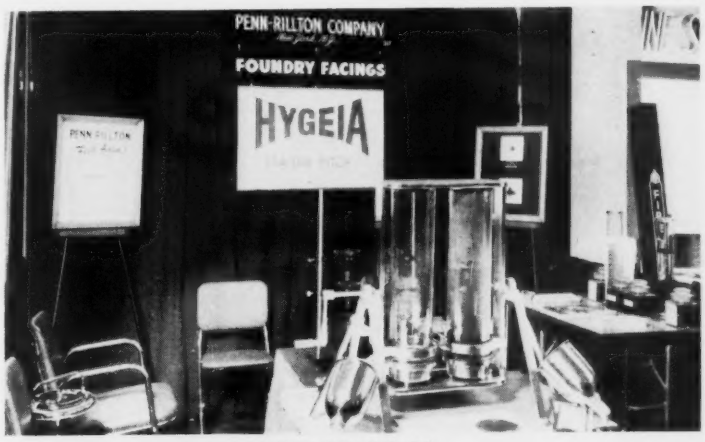


METALS DISTINTEGRATING CO.



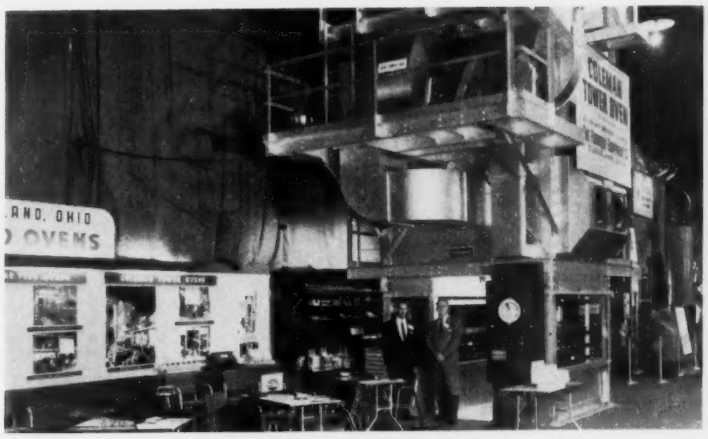
WM. H. NICHOLLS CO. INC.

HARNISCHFEGER CORP.



PENN-RILLTON CO.

REDFORD IRON & EQUIPMENT CO.



FOUNDRY EQUIPMENT CO.

SUTTER PRODUCTS CO.

BAKELITE CO., DIV. OF UNION CARBIDE & CARBON CORP.

JEFFREY MFG. CO.

HARBISON-WALKER REFRACTORIES CO.

ROTOR TOOL CO.

WESTOVER ENGINEERS

TRACTOMOTIVE CORP.

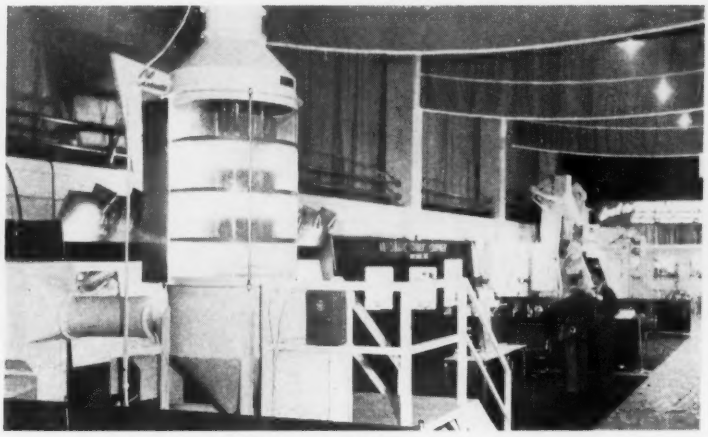
NORTON CO.

ACME RESIN CORP.

FREDERIC B. STEVENS INC.

SHALCO ENGINEERING CORP., SHALLWAY CORP.

KWIK-MIX CO.



CLAUDE B. SCHNEIBLE CO.

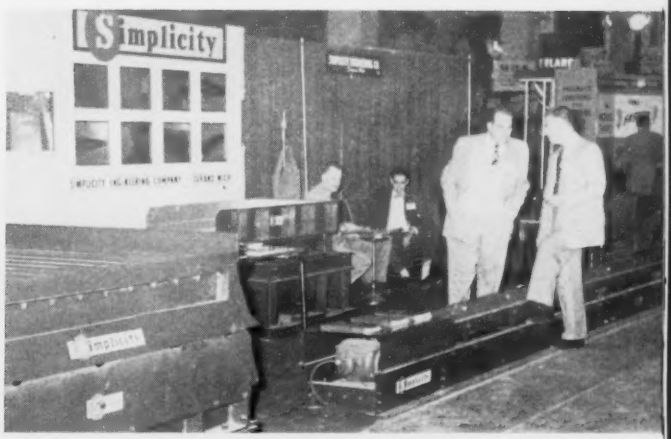
FANNER MFG. CO.

ILLINOIS CLAY PRODUCTS CO.

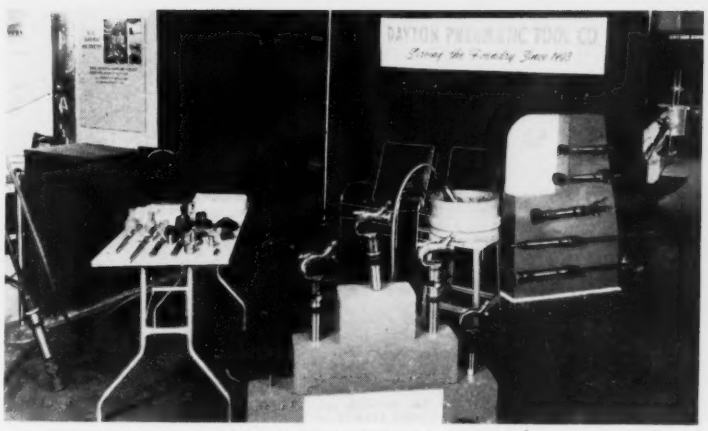
AIR REDUCTION SALES CO.

AJAX FLEXIBLE COUPLING CO. INC.

MACKLIN CO.



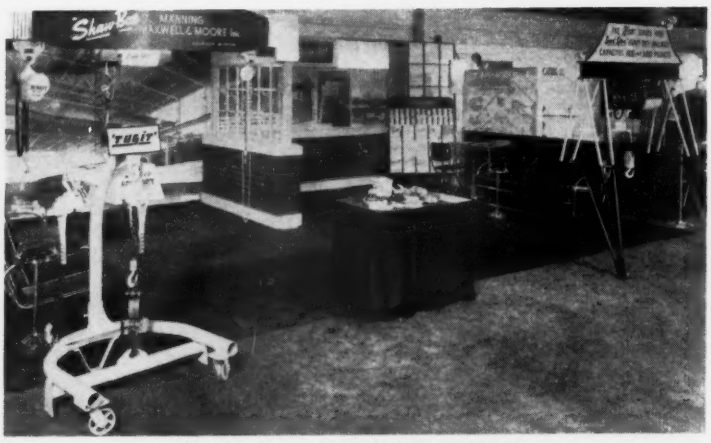
SIMPLICITY ENGINEERING CO.



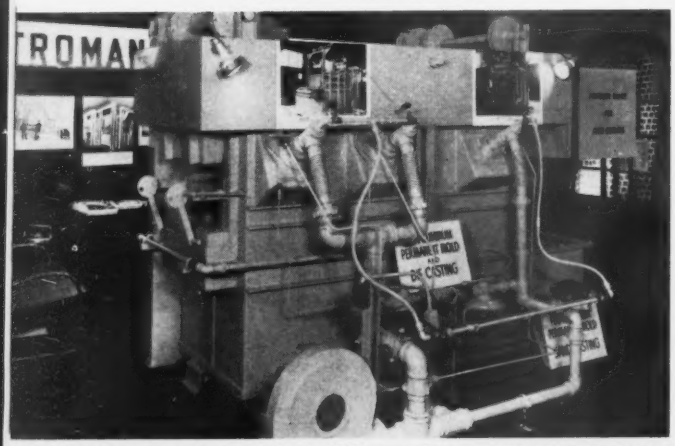
DAYTON PNEUMATIC TOOL CO.

A. P. GREEN FIRE BRICK CO.

CLEVELAND VIBRATOR CO.



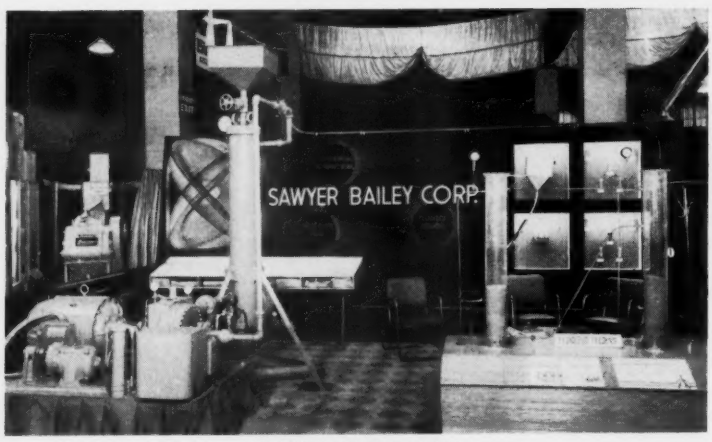
MANNING, MAXWELL & MOORE INC.



STROMAN FURNACE & ENGINEERING CO. DIV., PETERSEN OVEN CO.

SIMONDS ABRASIVE CO.

TOLEDO SCALE CO.



SAWYER BAILEY CORP.

SWAN-FINCH OIL CORP.

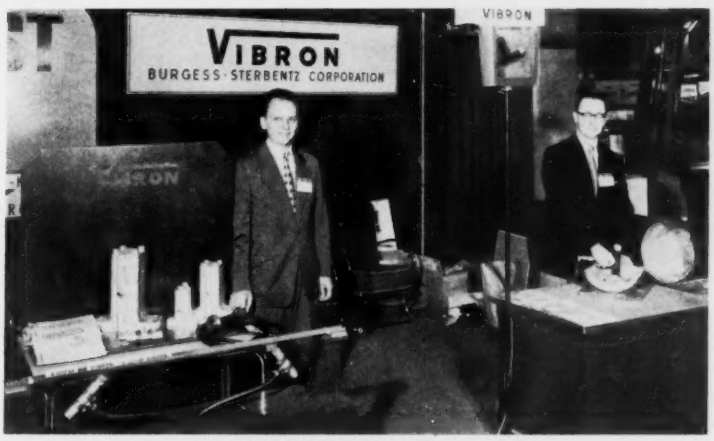
HEWITT-ROBINS INC.

SCHRAMM INC.

WOOD FABRICATING CO.

PEKAY MACHINE & ENGINEERING CO.

BLAW-KNOX CO.



BURGESS-STERBENTZ CORP.

EASTMAN KODAK CO.

GIRDLER CO., THERMEX DIV.

MODERN EQUIPMENT CO.

AMERICAN SILICA SAND CO. INC.

NATIONAL CARBON CO., DIV. OF UNION CARBIDE & CARBON CORP.

CLECO DIV., REED ROLLER BIT CO.

BARRETT DIV., ALLIED CHEMICAL & DYE CORP.

SPECIALTY PRODUCTS CO., HICKORY SPECIALTY CO.

AUSTIN WESTERN CO.

LATROBE STEEL CO.

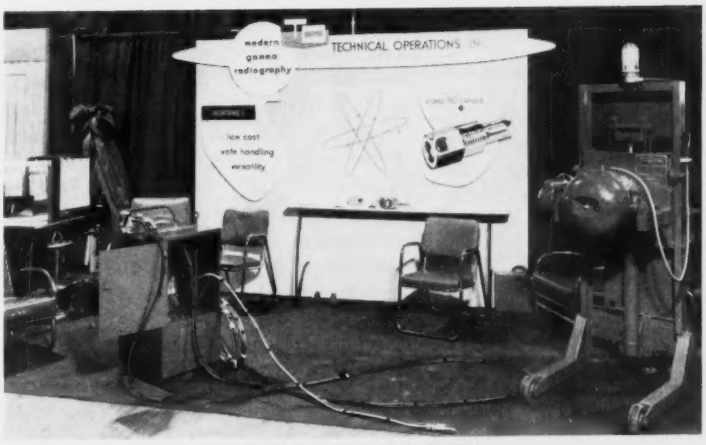
FABREEKA PRODUCTS CO.

FOUNDRY SERVICES INC.

SCIENTIFIC CAST PRODUCTS CORP.

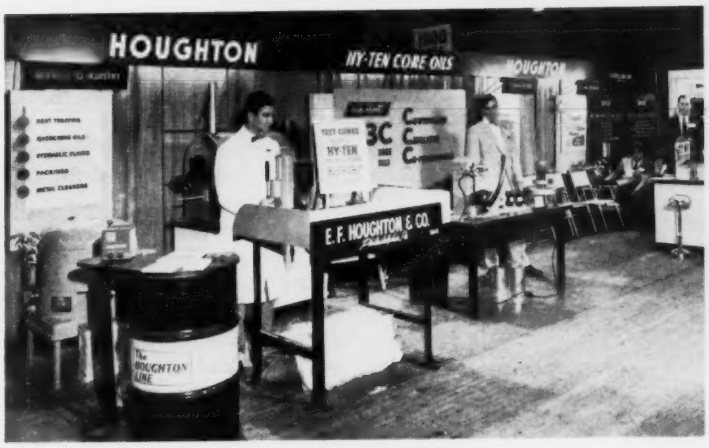
ALLOY METAL ABRASIVE CO.

MASTER PNEUMATIC TOOL CO.



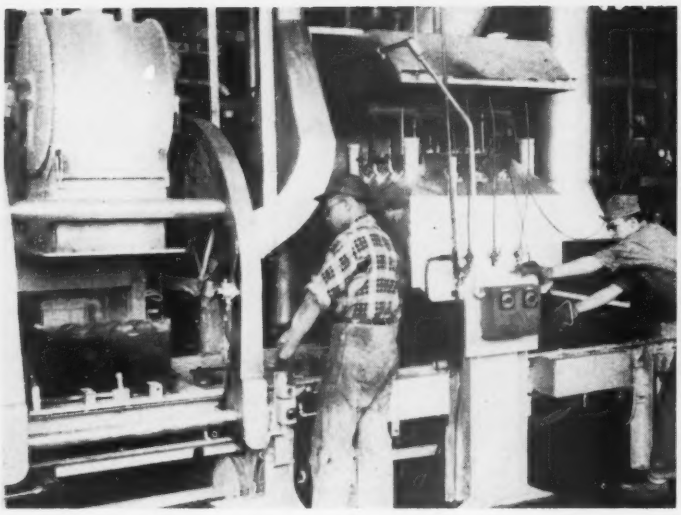
TECHNICAL OPERATIONS INC.

IRONTON FIRE BRICK CO.

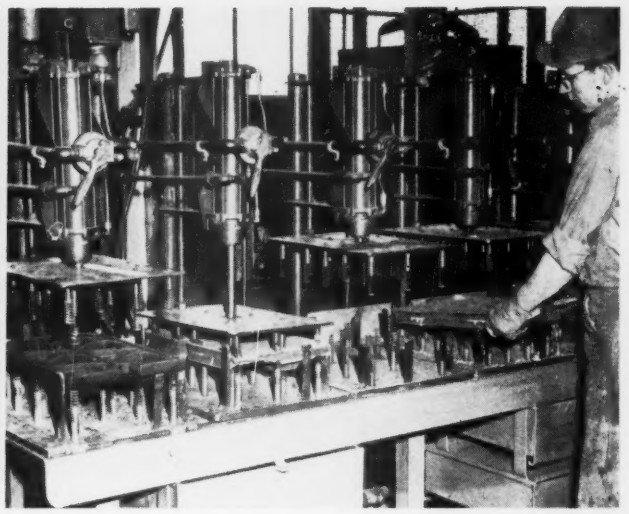


E. F. HOUGHTON & CO.

LINDE AIR PRODUCTS CO., DIV., UNION CARBIDE & CARBON CORP.



Designed by International Harvester Co., this shell molding machine now is used to produce four parts



Before they have cooled off, halves of a mold are assembled on these air-operated squeeze presses

I-H in Commercial Production of

SHELL MOLD CASTINGS

SHELL molding production of four truck engine part castings was started early this year at the Indianapolis Truck Engine Works, International Harvester Co. The parts include two exhaust seal rings and two exhaust pipe flanges. The shell molding method, known at International Harvester by its registered trade name of Contour, has completely eliminated the machining once necessary on these parts due to the closer tolerances that can be attained compared with conventional molding.

The company began study and research on the shell mold process in 1949 in its manufacturing research department, Chicago. (The first results of this research were published in FOUNDRY in November and December, 1952.) An important project currently under way is on a comparison of castings made by the conventional green sand method vs shell molding process in regard to finish, strength, chilling tendency and machinability. A decided advantage has been found in machining shell process castings in turning, milling and broaching operations.

The shell molding machine used in the production of the four parts mentioned is a square type unit built by the plant engineering department of the Indianapolis plant. The patterns, which are standard size 20 x 24 in., move through the unit by automatic conveyor. A roll-over sand hopper deposits the sand-resin mix upon the patterns. Curing is done in a hood-type radiant gas oven by raising the pattern into position under the hood. Stripping or ejection of shell is accomplished by an air push-off type machine.

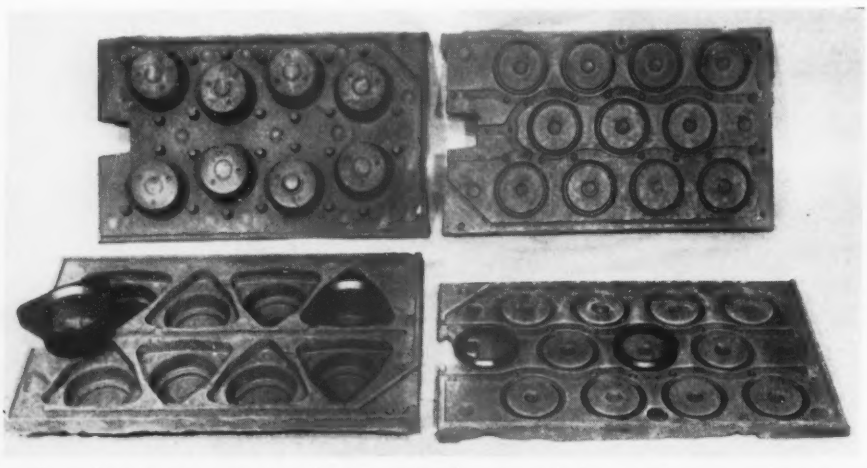
The molding machine can handle eight patterns at one time, producing a mold every 45 seconds. The 20 x 24 in. patterns allow the casting of 11 exhaust seal rings in one mold. Also, three exhaust pipe flanges of the larger type or eight exhaust pipe flanges of the smaller type can be cast in a single mold.

Other truck engine parts are being readied for production on this machine. Since some of the parts will involve only short runs, it is expected that as many as 15 patterns will be needed to operate the machine at full capacity. A second machine will be used entirely for production of flywheel castings. Shell molding will eliminate the need for machining the engine side of this flywheel.

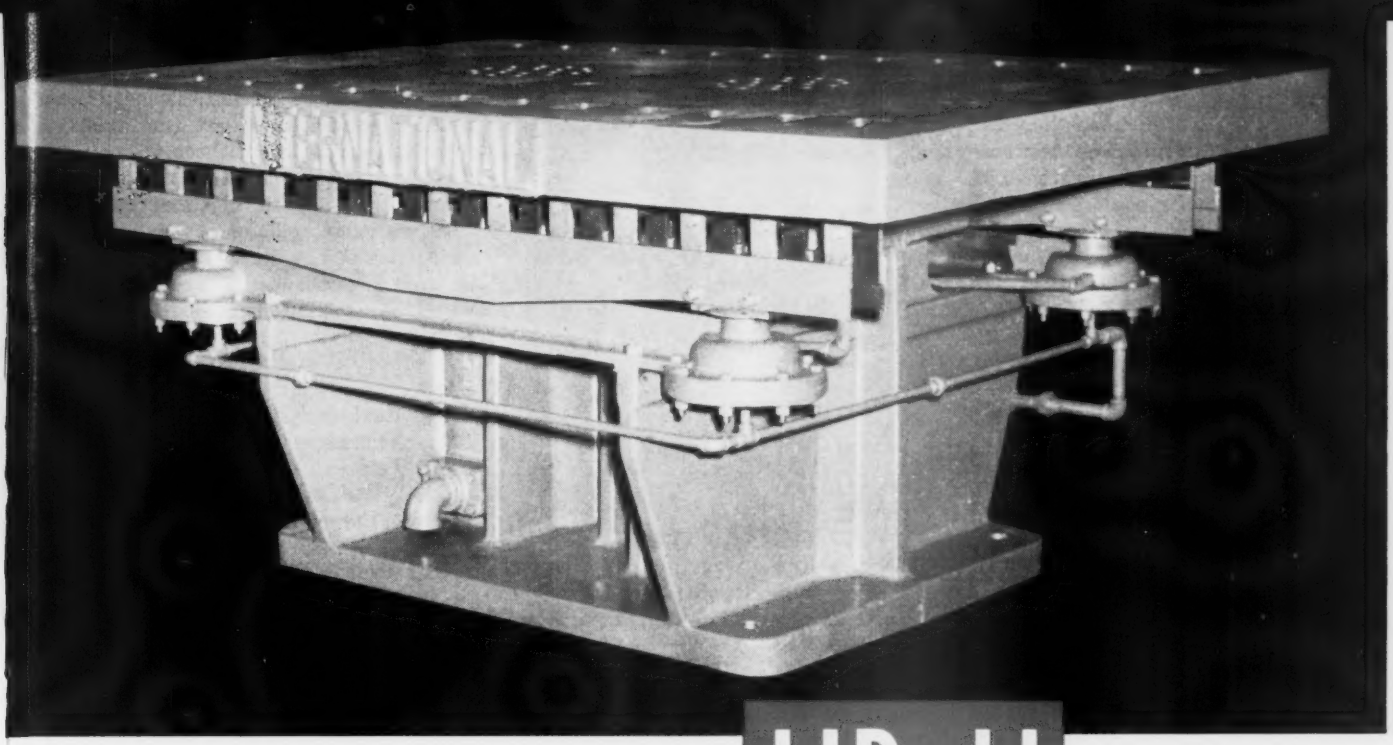
Special receiving and storage facilities are needed for the shell molding sand. Since the sand must be kept dry, it is shipped to the plant in closed-top railroad cars with hopper bottoms. Cars are backed into the unloading shed, and sand is then dumped onto an apron conveyor under the building, delivered to the elevator, and dropped from the elevator into a specially built concrete block silo of 500 tons capacity.

Sand is removed from the silo by means of an elevator and deposited in special portable hoppers placed on a scale. An exact amount of sand is required to assure the correct ratio of sand to resin. Fork lift trucks transport the sand from storage to a muller where the sand and the resin are mixed. The muller, locat-

(*Concluded on page* 128)

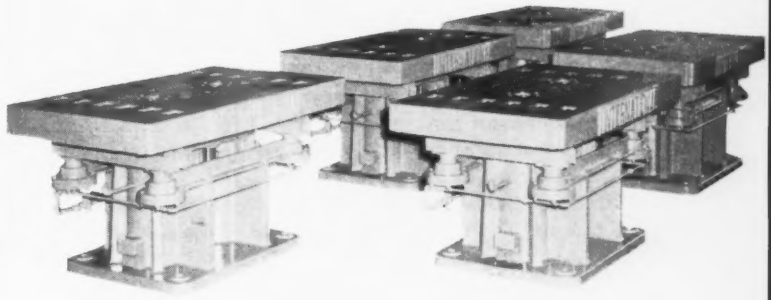


Samples of exhaust pipe flange and exhaust seal ring castings are shown here with the mold halves which form complete molds after their assembly



INTERNATIONAL TYPE JJR-JJ MACHINES

BIG TO SMALL WE BUILD THEM ALL



The International JJ and JJR Machines incorporate the Double Jolt feature and the sturdiness so necessary to give a positive ram throughout the core or mold.

750 lb. to 10,000 lb. jolt capacity.

On JJR Machines, rollers can be designed for loading and unloading in any direction, and are lowered by air cylinders before jolting.

The International Type JJR Machine illustrated at top has a table size 72"x100", 10,000 pound jolt capacity. The International Type JJR Machines illustrated below it have a table size of 48"x72", and a 5,000 pound jolt capacity.

Table sizes can be made to suit individual requirements.

NOTE: THE TYPE JJ MACHINE IS THE SAME AS THE TYPE JJR EXCEPT THAT IT DOES NOT HAVE ROLLERS.

BUILT RIGHT
PRICED RIGHT

There is an INTERNATIONAL for Every Job.

Internationals are designed and built by experienced Foundry Engineers, who have a practical knowledge of the problems of the foundry business.

INTERNATIONAL MOLDING MACHINE COMPANY

LA GRANGE PARK, ILLINOIS

(*Concluded from page* 126)

ed above the molding machines, can mix 3000 lb of sand in a 15-minute mixing cycle and empties the mix into a 5000-lb hopper. From the hopper the mix is fed into the machines by screw conveyor.

A polyvinyl resin is used for sealing together the two halves of each shell mold. After application of the adhesive and assembly of the halves, they are placed in an air-operated squeeze press which holds the halves together firmly while the resin sets.

Conventional molding sand is used for backing of the molds in the flask preparatory to pouring. Six molds are placed in a vertical position in the flask and a jolt machine is used to ram the molds. As a part of this process a common runner has been developed for pouring of the iron. The mold is then placed on a conventional pouring conveyor where it goes through regular pouring and shakeout procedures followed by cooling and cleaning of the casting the same as for other production castings.

The company does not expect that elimination of machining will generally be obtained with shell molding, such as was the case with the seal rings and pipe flanges. Its research has shown that percentages of reduction in machining requirements for automotive type castings will vary according to specifications for tolerances and surface finish.

Sand must be kept dry. It is unloaded in shed and stored in concrete silo with 500-ton capacity.

ASTM MEETS IN CHICAGO

To Discuss New Specifications

By EDWIN BREMER
Metallurgical Editor

THE American Society for Testing Materials held its 57th annual meeting June 13-18 at Hotels Sherman and Morrison, Chicago. The meeting included 33 technical sessions, two lectures, a luncheon, the annual society dinner, and numerous committee meetings.

At the luncheon 11 members of ASTM were presented awards of merit for distinguished service to the organization. They included Sam Tour, Sam Tour & Co. Inc., New York, and Ernest E. Thum, American Society for Metals, Cleveland.

Newly elected officers of the society introduced were: President, N. L. Mochel, Westinghouse Electric Corp., Philadelphia; vice president, R. A. Schatzel, Rome Cable Corp., Rome, N. Y.; directors, E. J. Albert, Thwing-Albert Instrument Co., Philadelphia, J. M. Campbell, General Motors Corp., Detroit, P. V. Garin, Southern Pacific Co., San Francisco, J. H. Jenkins, Canadian Forest Products Laboratory, Ottawa, and D. E. Parsons, National Bureau of Standards, Washington.

Following the address of retiring president L. C. Beard Jr., Socony-Vacuum Oil Co. Inc., New York, honorary memberships were presented to K. G. Mackenzie, Texaco Development Corp., Westport, Conn., and L. H. Winkler, Bethlehem Steel Co., Bethlehem, Pa.

In the annual report presented by Robert J. Painter, executive secretary, the numerous and widespread activities of the society were discussed briefly. Membership is growing steadily and at present the society has developed over 2000 specifications, test methods, definitions, etc.

Annual Gillett memorial lecture on "Fatigue of Aluminum" by R. L. Templin, Aluminum Co. of America, New Kensington, Pa., was presented by F. M. Howell, one of his colleagues, due to illness of the author. The Marburg lecture was given by H. F. Dodge, Bell Telephone Laboratories, New York, and dealt with "Interpretation of Scientific and Engineering Data" or application of statistical quality control.

Following the lecture the Charles B. Dudley medal was awarded to C. E. Work, and T. J. Dolan, University of Illinois, Urbana, Ill.; the Richard L. Templin award was presented to E. T. Wessel and R. D. Olleman, Westinghouse Electric Corp., East Pittsburgh, Pa., and the Sam Tour award was given to J. T. Richards, Penn Precision Co. Inc., Reading, Pa.

In one session entitled "What Standards Mean to Us," Robert J. Painter pointed out that the words "standards," "specifications" and "testing methods" are used somewhat interchangeably, and that a specification without methods of evaluating properties of the material or product covered are valueless. Development of suitable working specifications requires adjustment of viewpoints of the producer and consumer of material or product.

Specifications from the viewpoint of the consumer were discussed by A.W.F. Green, Allison Division, General Motors Corp., Indianapolis, while that of the producer was described by A. O. Schaefer, Midvale Co., Nicetown, Pa. Capt. C. R. Watts, Office of Assistant Secretary of Defense, Washington, discussed "Materials' Standards and the Department of Defense."

Committee A-3 on Cast Iron recommended for adoption as standards without change that on "Tentative Methods of Impact Testing of Cast Iron" (A 327-50T), publication as tentative "Specifications for Cast Iron Pressure Pipe," and withdrawal of "Standard Specifications for Cast Iron Pit-Cast Pipe for Water or Other Liquids" (A 44-41) which the former tentative replaces.

Committee B-7 on Light Metals and Alloys, Cast and Wrought recommended extensive revisions in "Specifications for Aluminum-Base Alloy Sand Castings" (B 26-52T), and "Specifications for Aluminum-Base Alloy Permanent Mold Castings" (B 108-52T). These include addition of minimum yield strength in Table II, and elimination of Table IV in both.

Committee B-6 on Die-Cast Metals and Alloys recommended revision of "Tentative Specifications for Aluminum-Base Alloy Die Castings" (B 85-52T) to include 11 instead of 10 alloys. New alloy SC 114A contains 3.0 to 4.5 per cent Cu, 1.3 per cent max Fe, 10.5 to 12.0 per cent Si, 0.5 per cent max Mn, 0.1 per cent max Mg, 1.0 per cent max Zn, 0.5 per cent max Ni, 0.3 per cent max Sn, 0.5 per cent max total other constituents except Al, and remainder Al.

Committee B-5 on Copper and Copper Alloys, Cast and Wrought recommended publications of a new tentative "Tentative Specifications for Nickel-Tin Bronze Castings" (see page 149), adoption as standard "Tentative Recommended Practice for Tension Tests Specimens for Copper-Base Alloys for Sand Castings" (B 208-49T), and a slight revision in "Standard Specification for Copper-Base Alloys in Ingot Form for Sand Castings" (B 30-49).

Ohio Ferro-Alloys Assures Stainless Steel Producers Additional Supply of LOW CARBON FERROCHROME in Growth Years Ahead

Since it was introduced in the 20's, production of stainless steel has more than doubled every decade. Industry leaders confidently predict this growth will continue despite temporary interruptions. There have been times in recent years when shortages of Low Carbon Ferrochrome severely hampered stainless production. To assure producers an adequate supply in the growth years ahead, Ohio Ferro-Alloys Corporation has added Low Carbon Ferrochrome to its line of quality ferro-alloys. Production schedules permit immediate shipment of these grades:

Max. 0.04% carbon	Max. 0.15% carbon
Max. 0.06% carbon	Max. 0.20% carbon
Max. 0.10% carbon	Max. 0.50% carbon

Other Ohio Ferro Products

- FERRO - SILICON 25 - 50 - 65 - 75 - 85 - 90%
- SPECIAL BLOCKING 50% FERRO - SILICON
- SILICON METAL
- HIGH CARBON FERRO-CHROME
- LOW CARBON FERRO-CHROME SILICON
- FERRO - MANGANESE
- SILICO-MANGANESE
- BOROSIL
- SIMANAL
- RARE EARTH ALLOYS

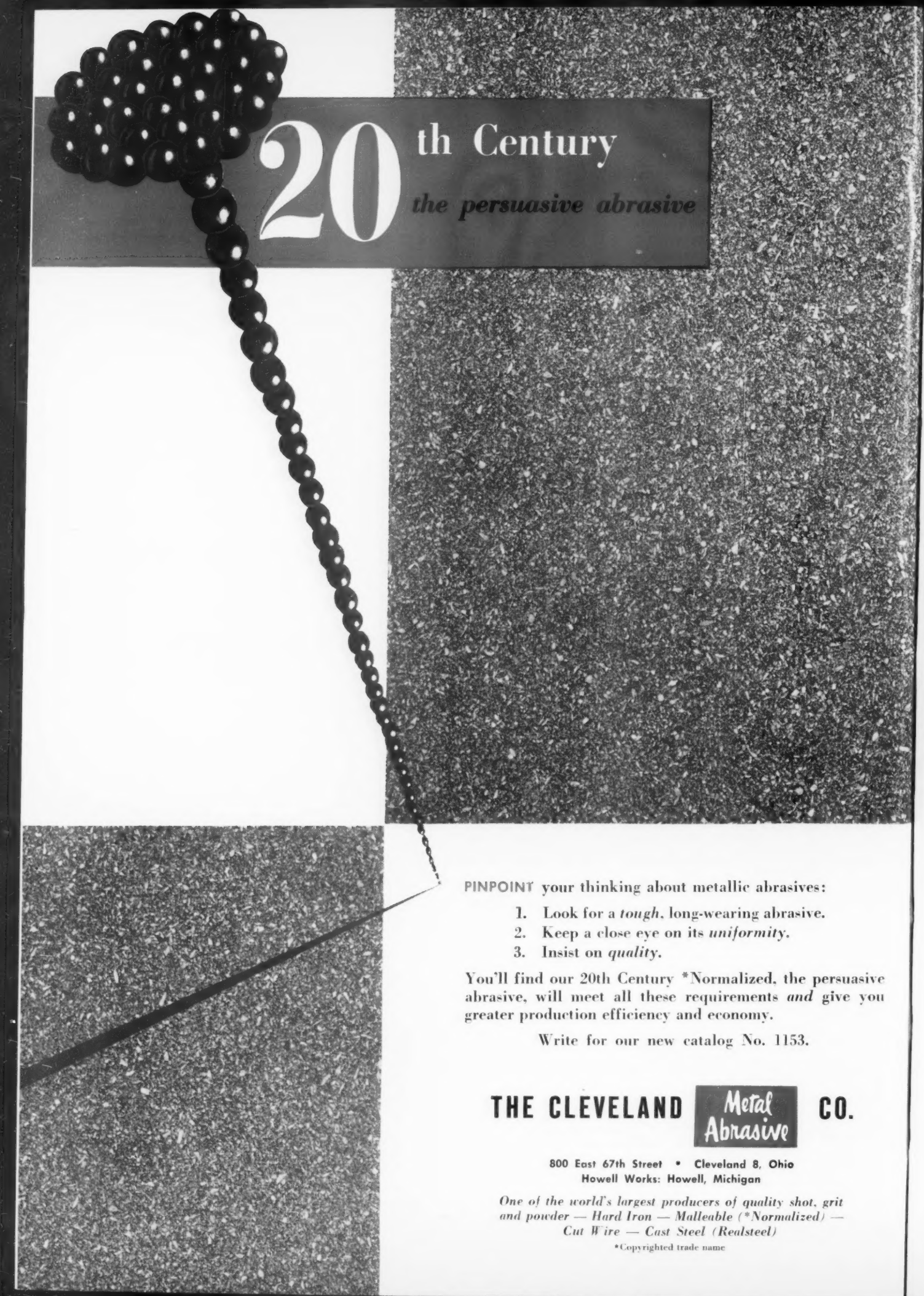
Briquets

- SILICON
- MANGANESE
- SILICO-MANGANESE
- CHROME

PHILO · TACOMA · BRILLIANT

Ohio Ferro-Alloys Corporation
Canton, Ohio

Chicago Detroit Pittsburgh Tacoma Seattle
Minneapolis Birmingham San Francisco Los Angeles



PINPOINT your thinking about metallic abrasives:

1. Look for a *tough*, long-wearing abrasive.
2. Keep a close eye on its *uniformity*.
3. Insist on *quality*.

You'll find our 20th Century *Normalized, the persuasive abrasive, will meet all these requirements *and* give you greater production efficiency and economy.

Write for our new catalog No. 1153.

THE CLEVELAND Metal Abrasive **CO.**

800 East 67th Street • Cleveland 8, Ohio
Howell Works: Howell, Michigan

*One of the world's largest producers of quality shot, grit and powder — Hard Iron — Malleable (*Normalized) — Cut Wire — Cast Steel (Realsteel)*

*Copyrighted trade name

FOUNDRY STATISTICS

MALLEABLE IRON

(Shipments of castings—net tons[1])

	Shipments—Total	Shipments—For Sale	Unfilled Orders[2]
1952	926,120	573,472	.....
1953			
Apr.	95,923	57,757	174,514
4 mo.	364,168	220,017	.....
May	82,050	48,011	160,387
June	86,514	50,819	151,016
July	77,111	45,413	137,251
Aug.	73,855	45,415	120,801
Sept.	74,333	45,466	114,523
Oct.	73,473	45,515	104,046
Nov.	63,435	37,500	93,156
Dec.	72,126	39,657	95,612
Total	967,065	577,813	.....
1954			
Jan.	70,288	38,266	85,565
Feb.	69,078	37,792	81,579
Mar.	84,342	47,125	74,219
Apr.	74,515	39,102	69,094
4 mo.	298,223	162,285	.....

COPPER-BASE ALLOY

(Shipments of castings—1000 pounds[1])

	Shipments—Total	Shipments—Sand	Shipments—Perm. Mold	Unfilled Orders[2]
1952	1,009,910	910,862	63,865	.....
1953				
Apr.	94,063	85,171	5,463	70,913
4 mo.	358,439	322,453	21,731	.....
May	84,550	76,239	4,856	65,346
June	83,947	75,625	4,705	62,843
July	69,957	63,365	3,927	60,381
Aug.	77,652	69,852	4,890	61,646
Sept.	79,595	71,184	5,273	57,209
Oct.	83,899	74,460	5,775	51,723
Nov.	74,782	66,370	5,077	48,842
Dec.	77,675	68,821	5,082	48,421
Total	990,496	888,369	61,316	.....
1954				
Jan.	71,437	63,034	4,618	42,351
Feb.	68,849	60,913	4,743	21,943
Mar.	76,480	67,952	5,123	38,417
Apr.	72,900	65,418	4,732	34,111
4 mo.	289,666	257,317	19,216	.....

ALUMINUM

(Shipments of castings—1000 pounds)

	Shipments—Total	Shipments—Sand	Shipments—Perm. Mold	Shipments—Die	Unfilled Orders[2]
1952	518,979	194,616	146,883	169,732	.....
1953					
Apr.	61,461	20,158	18,628	22,305	140,343
4 mo.	231,578	76,580	69,503	84,354	.....
May	57,340	19,639	16,528	20,858	137,065
June	56,492	19,349	15,528	21,335	135,486
July	51,196	16,614	15,692	18,549	125,330
Aug.	50,428	15,940	16,252	17,837	126,781
Sept.	53,306	17,826	17,189	17,875	120,828
Oct.	55,097	17,171	17,030	20,547	115,189
Nov.	51,014	16,169	15,396	19,012	106,977
Dec.	51,571	15,265	16,907	18,963	105,980
Total	658,022	214,553	200,025	239,330	.....
1954					
Jan.	51,446	14,698	16,615	19,709	103,318
Feb.	51,213	14,696	17,281	18,754	96,011
Mar.	56,184	14,468	19,576	21,645	93,407
Apr.	53,006	14,073	18,091	20,366	91,853
4 mo.	211,849	57,935	71,563	80,474	.....

MAGNESIUM

(Shipments of castings—1000 pounds[1])

	Shipments—Total	Shipments—For Sale	Unfilled Orders[2]
1952	34,857	32,977	.....
1953			
Apr.	3,332	3,084	12,717
4 mo.	13,121	12,164	.....
May	2,705	2,460	13,646
June	3,063	2,679	13,756
July	2,287	2,079	13,927
Aug.	2,490	2,281	13,202
Sept.	2,455	2,238	12,528
Oct.	3,024	2,717	11,473
Nov.	2,681	2,417	10,612
Dec.	2,691	2,434	9,313
Total	34,517	31,469	.....
1954			
Jan.	2,451	2,149	8,800
Feb.	2,194	1,945	8,315
Mar.	2,407	2,109	7,698
Apr.	2,068	1,857	7,358
4 mo.	9,120	8,060	.....

PRODUCTION WORKERS

Estimated Number

(Thousands)

	Apr. 1954	Mar. 1954	Apr. 1953
Ferrous	194,300	195,000	229,800
Nonferrous	61,000	63,300	79,100

Average Weekly Earnings

Gray Iron	$72.37	$71.42	$77.10
Malleable Iron	72.39	74.68	79.68
Steel	73.48	76.43	80.95
Nonferrous	78.01	79.00	80.56

Average Weekly Hours

Gray Iron	38.7	38.4	41.9
Malleable Iron	37.9	39.1	41.5
Steel	37.3	38.6	41.3
Nonferrous	39.2	39.5	41.1

Labor Turnover Rate (Apr.)

(Per 100 employees)

	Total Accession	Total Separation	Quit	Layoff
Gray Iron	2.2	4.0	1.0	2.5
Malleable Iron	2.0	3.7	1.0	2.3
Steel	1.4	4.9	0.6	3.9
Nonferrous	1.9	8.5	0.9	7.1

Source: Bureau of Labor Statistics

GRAY IRON CASTINGS—SHIPMENTS

(Net tons[1])

	All Castings—Total	All Castings—For Sale	Miscellaneous Castings—Total	Miscellaneous Castings—For Sale	Heavy Steel Ingot Molds—Total	Heavy Steel Ingot Molds—For Sale	Chilled Railroad Car Wheels—Total	Pressure Pipe & Fittings—Total[3]	Soil Pipe & Fittings—Total[4]	Unfilled Orders[2]
1952	12,862,494	7,373,757	8,095,299	3,794,164	2,238,309	1,070,252	544,896	1,312,518	651,472	.....
1953										
Apr.	1,277,288	683,047	799,872	329,802	246,873	122,702	44,877	120,105	65,561	1,305,849
4 mo.	4,839,372	2,587,319	3,052,325	1,310,889	977,861	467,244	179,096	422,072	218,018	.....
May	1,185,545	641,581	734,326	312,836	238,202	115,728	41,373	113,136	58,508	1,271,711
June	1,196,106	648,400	743,737	312,681	232,596	115,946	45,542	114,118	60,113	1,245,904
July	1,056,422	573,280	652,371	274,890	212,187	106,526	36,715	97,739	57,410	1,232,651
Aug.	1,069,392	588,543	646,902	286,449	217,930	107,428	40,327	107,805	56,428	1,222,612
Sept.	1,105,582	611,905	669,225	289,909	232,055	117,694	37,055	108,270	58,977	1,170,191
Oct.	1,141,526	650,229	669,757	300,249	245,966	124,177	41,917	118,306	65,580	1,075,538
Nov.	1,004,326	563,930	589,657	266,039	227,800	111,022	31,373	101,576	53,920	977,012
Dec.	1,032,444	552,565	634,250	274,203	228,532	108,700	30,051	94,053	45,558	954,885
Total	13,630,715	7,417,752	8,392,550	3,537,645	2,813,129	1,374,465	473,449	1,277,075	674,512	.....
1954										
Jan.	932,298	488,497	607,755	261,164	154,359	60,947	31,316	90,898	47,970	871,918
Feb.	936,364	491,983	607,085	252,591	156,933	70,261	29,240	92,546	50,560	865,344
Mar.	1,046,779	553,358	684,272	282,328	153,366	65,950	34,240	113,016	61,895	842,499
Apr.	995,052	528,027	657,126	263,147	126,083	56,114	29,075	116,420	66,348	826,491
4 mo.	3,910,493	2,062,065	2,556,238	1,059,230	590,741	253,272	123,871	412,880	226,763	.....

STEEL CASTINGS—SHIPMENTS

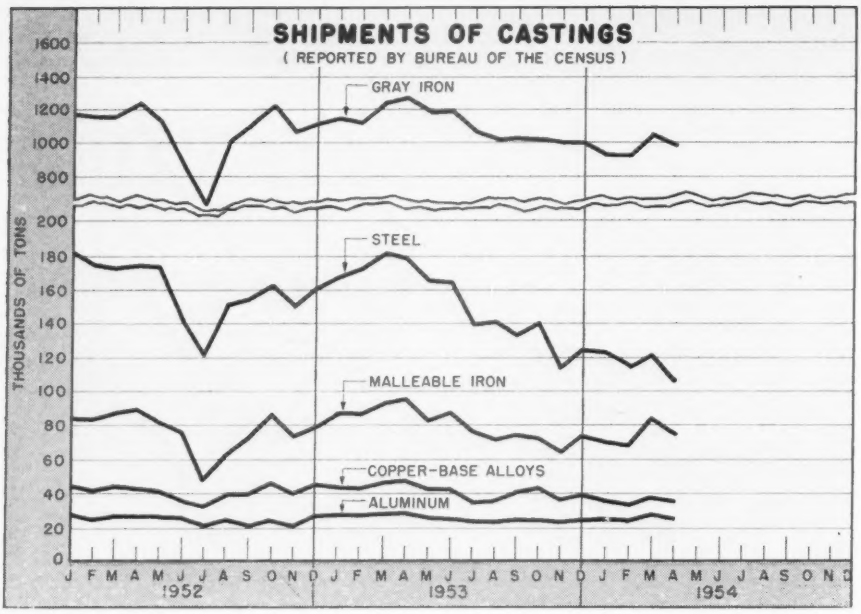
(Net tons[1])

	All Castings—Total	All Castings—For Sale	All Castings—Railway Specialties	Carbon Steel—Total	Carbon Steel—For Sale	Carbon Steel—Railway Specialties	Alloy Steel—Total	Alloy Steel—For Sale	Alloy Steel—Railway Specialties	Unfilled Orders[2]
1952	1,925,707	1,476,746	342,561	1,496,450	1,053,264	298,948	553,403	430,493	40,613	.....
1953										
Apr.	179,615	140,051	34,035	128,457	99,602	31,212	51,158	40,938	2,823	573,565
4 mo.	704,682	546,335	128,705	498,559	383,712	117,600	206,133	164,840	11,105	.....
May	165,649	126,380	29,552	117,318	88,781	26,888	48,331	38,036	2,664	328,931
June	164,665	125,984	30,381	116,358	88,260	27,767	48,307	38,130	2,614	475,756
July	139,577	105,687	22,925	95,891	71,488	20,938	43,686	34,532	1,987	467,900
Aug.	141,340	107,941	25,026	97,076	73,784	22,637	44,264	35,003	2,389	418,927
Sept.	135,303	102,880	24,108	95,944	72,780	21,724	39,359	30,338	2,384	327,172
Oct.	140,702	106,788	25,354	100,568	76,118	23,449	40,134	30,988	1,905	313,684
Nov.	114,088	84,945	17,784	79,989	57,947	16,233	34,099	27,167	1,551	308,526
Dec.	123,281	91,017	18,685	86,465	62,377	16,998	36,674	29,952	1,687	278,389
Total	1,829,287	1,397,957	322,520	1,288,168	975,247	294,234	540,977	428,986	28,286	.....
1954										
Jan.	122,758	93,577	20,197	83,927	62,749	18,407	38,831	30,828	1,790	251,847
Feb.	116,520	88,699	17,938	81,433	60,638	15,961	35,087	28,061	1,967	234,634
Mar.	122,310	92,271	15,684	85,211	62,955	14,190	37,099	29,316	1,494	214,367
Apr.	105,788	78,754	11,031	72,118	52,389	9,538	33,670	26,365	1,493	197,857
4 mo.	467,376	353,301	64,850	322,689	238,731	58,096	144,687	114,570	6,744	.....

[1]Source: Bureau of Census. [2]For sale only. [3]All cast iron pipe is shipped for sale.

(Concluded on page 132)

FOUNDRY STATISTICS (Concluded from page 131)



INDEX OF FOUNDRY EQUIPMENT ORDERS

Foundry Trades Only
(Net Orders Closed, New Equipment)

	1953	1954
Jan.	99.6	173.8
Feb.	97.5	99.9
Mar.	132.2	82.7
Apr.	111.8	125.3
May	182.7	80.8
June	156.8	....
July	159.2	....
Aug.	236.3	....
Sept.	127.7	....
Oct.	87.2	....
Nov.	150.0	....
Dec.	161.2	....

Note: Figures are percentages of the base period 1947-49 taken as 100 per cent (monthly average). This is a new base period. Source: Foundry Equipment Manufacturers Association.

INGOT BRASS & BRONZE

(Shipments in net tons)

	1953	1954
Jan.	24,423	20,661
Feb.	25,429	19,920
Mar.	28,256	23,653
Apr.	25,044	24,746
May	21,660	22,269
June	20,818	.....
July	19,321	.....
Aug.	20,156	.....
Sept.	21,463	.....
Oct.	22,280	.....
Nov.	21,860	.....
Dec.	20,541	.....
Total for year	271,251	.....

ZINC-BASE ALLOY

(Shipments of castings—1000 pounds[1])

	Shipments—Totals	Shipments—For Sale	Unfilled Orders[2]
1952	408,353	282,673	.....
1953			
Apr.	51,301	34,519	92,435
4 mo.	195,683	132,325	.....
May	44,174	29,106	85,642
June	48,806	31,010	88,533
July	38,968	24,829	83,508
Total	521,253	349,022	.....
1954			
Jan.	40,396	27,257	61,754
Feb.	37,660	24,112	55,351
Mar.	42,991	28,828	52,544
Apr.	38,968	25,211	51,388
4 mo.	160,015	105,408	.....

COKE PRODUCTION & CONSUMPTION

(Net tons)

	Production	Consumption Total	Consumption By Foundries
1952	68,254,109	67,865,639	3,102,446
1953			
Apr.	6,543,601	6,541,307	271,955
4 mo.	26,289,658	26,573,392	1,033,962
May	6,824,810	6,752,823	272,673
June	6,625,223	6,692,864	254,830
July	6,748,229	6,654,080	217,504
Aug.	6,719,941	6,587,005	236,738
Sept.	6,404,143	6,330,441	236,119
Oct.	6,554,638	6,555,613	236,329
Nov.	6,208,155	6,039,813	216,837
Dec.	6,093,009	6,041,383	210,388
Total	78,467,806	78,227,414	2,915,420
1954			
Jan.	5,812,426	5,639,117	224,298
Feb.	4,889,717	4,920,651	211,114
Mar.	5,146,189	5,177,765	228,139
Apr.	4,693,562	4,570,816	212,088
4 mo.	20,541,894	20,308,349	875,639

PIG IRON PRODUCTION AND CONSUMPTION

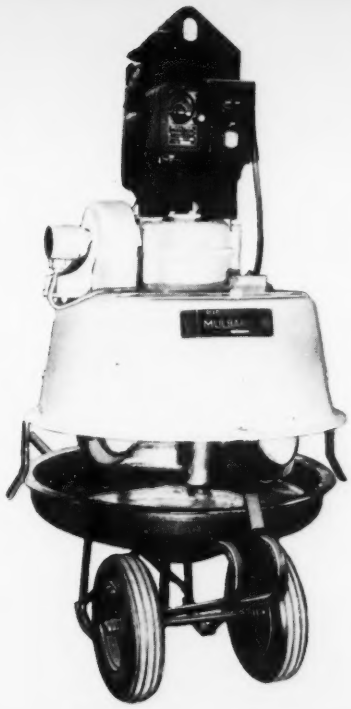
	Production** (Standard grades—net tons) Total	Foundry	Malleable	Basic	Low Phos. Intermediate Low Phos. & Bessemer	Consumption* (By type of furnace—gross tons) Total	Cupola	Air	Electric
1952	61,306,723	2,864,722	3,013,267	48,253,390	7,175,344	61,550,961	5,438,294	449,646	118,820
1953									
May	6,508,487	210,021	347,666	5,236,990	713,810	5,844,427	436,343	24,366	13,877
5 mo.	31,544,459	1,180,422	1,612,997	25,490,968	3,530,080	28,275,926	2,223,040	128,022	64,797
June	6,288,049	201,646	313,404	5,075,028	697,971	5,581,403	436,927	24,332	12,145
July	6,425,855	213,469	344,377	5,145,135	722,874	5,579,692	367,081	19,880	15,472
Aug.	6,381,056	202,116	310,717	5,167,059	701,164	5,672,037	385,003	20,829	14,206
Sept.	6,121,399	209,444	310,441	4,926,986	674,528	5,378,517	393,292	21,775	16,039
Oct.	6,409,245	218,880	290,882	5,175,064	724,479	5,733,466	395,066	21,349	13,206
Nov.	5,995,511	201,047	277,181	4,859,252	658,031	5,324,537	343,233	17,528	15,842
Dec.	5,712,937	172,283	276,432	4,625,524	638,698	5,091,786	374,838	18,596	12,561
Total	74,878,511	2,599,307	3,736,431	60,465,016	8,347,817	66,637,364	4,918,480	272,311	164,267
1954									
Jan.	5,531,137	184,629	294,691	4,510,870	540,947	4,933,282	362,576	17,620	14,578
Feb.	4,764,613	156,178	272,707	3,911,670	424,058	4,293,942	351,824	17,257	9,892
Mar.	4,907,147	213,249	243,356	3,977,137	473,405	4,367,814	390,929	21,369	13,112
Apr.	4,449,289	155,249	256,662	3,630,901	406,477	.....	.....	.....	.....
May	4,572,252	154,768	231,479	3,741,671	444,334	.....	.....	.....	.....
5 mo.	24,224,438	864,073	1,298,895	19,772,249	2,287,891	.....	.....	.....	.....

IRON AND STEEL SCRAP CONSUMPTION

(Gross tons*)

	All Scrap Total	All Scrap Purchased	By Types of Furnace: Cupola Total	Cupola Purchased	Air Total	Air Purchased	Electric Total	Electric Purchased
1952	61,625,549	30,520,946	9,154,146	4,752,497	1,053,233	395,591	8,015,064	5,190,833
1953								
Mar.	6,536,867	3,211,476	901,786	464,110	103,034	38,583	857,760	563,489
3 mo.	18,596,439	9,090,923	2,530,415	1,300,387	290,835	109,512	2,398,231	1,559,938
Apr.	6,227,089	3,026,533	921,589	474,185	106,449	41,004	820,647	531,509
May	6,294,920	3,105,598	861,404	450,477	92,703	35,566	798,098	523,606
June	5,951,170	2,835,875	876,320	454,905	99,799	38,934	743,530	468,129
July	5,539,468	2,597,365	729,114	369,283	74,815	26,755	691,521	443,263
Aug.	5,637,759	2,614,153	753,272	390,741	77,047	28,167	678,968	428,332
Sept.	5,395,721	2,393,773	782,131	405,274	80,866	29,032	595,523	363,706
Oct.	5,628,568	.....	779,444	.....	75,618	.....	566,878	.....
Nov.	5,064,565	.....	687,498	.....	60,200	.....	477,666	.....
Dec.	4,690,277	.....	755,276	.....	68,002	.....	442,818	.....
Total	69,005,976	.....	9,676,463	.....	1,026,334	.....	8,263,880	.....
1954								
Jan.	4,574,384	.....	711,335	.....	71,202	.....	505,536	.....
Feb.	4,385,340	.....	704,535	.....	67,263	.....	462,095	.....
Mar.	4,637,573	.....	783,529	.....	82,337	.....	517,702	.....
3 mo.	13,597,297	.....	2,199,399	.....	220,802	.....	1,485,333	.....

*Source: U. S. Dept. of Interior, Bureau of Mines. **Source: American Iron & Steel Institute. [1]Source: Bureau of the Census. [2]For sale only.



FOR LOW COST PREPARATION OF COATED SHELL MOLDING AND SHELL BLOWING SAND

the new

SHELL MULBARO

Improved quality and lower costs have initiated the trend to coated shell molding sands. Thorough uniform mulling and careful batch control are essential in the preparation of coated sands for shell molding and shell blowing processes. Yet, it's important to keep costs in line if the foundry is to succeed in this highly competitive market.

The shell Mulbaro is designed to meet these needs. It thoroughly mulls and fully prepares coated resin-sand mixes for the "C" or "D" processes using either the wet or dry mixing process. Yet, it's low installation cost and especially low operating costs help the foundry to improve its competitive position. The shell Mulbaro has all the extreme flexibility of the Mulbaro and a single Mulbaro mulling mechanism may be used with several portable mulling bowls.

and the standard

MULBARO

FOR NON-COATED RESIN-SAND MIXES AND FOR MOLDING AND CORE SANDS

Of course, the standard Mulbaro with its rubber-tired, spring-loaded mulling wheels and scientifically designed contoured mulling bowl is still the best choice for the foundry that requires small portable mulling equipment. Molding sands, core sands, and conventional resin-sand mixes are mulled with perfect uniformity in short time cycles.

One Mulbaro mulling mechanism can be used with several barrows permitting the foundry to obtain the capacity of several mixers at little more than the investment required for one. The mulled sand may be delivered directly to molder or coremaker in the barrow in which it is mulled.

FOR BOTH THE MULBARO AND SHELL MULBARO

MULLTROL MEANS CONTROL

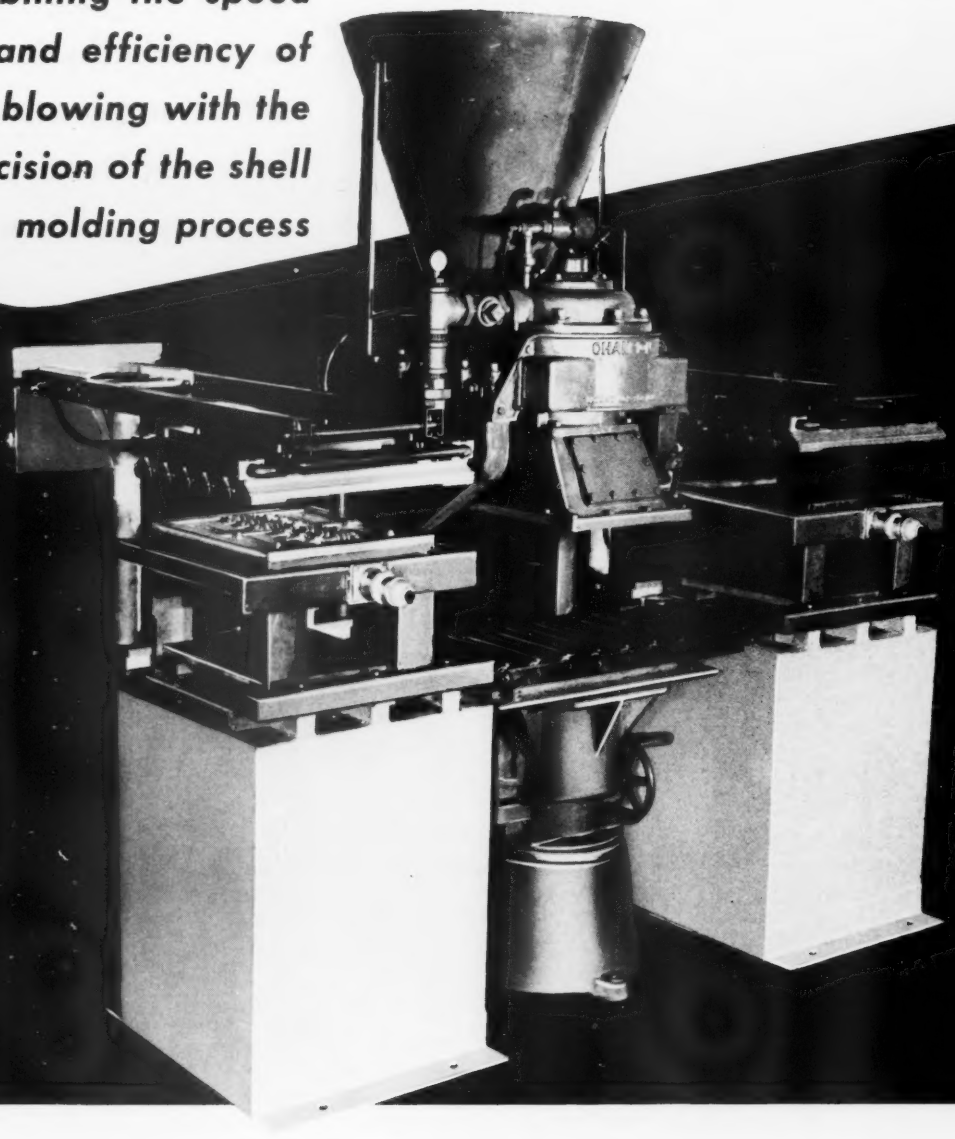
As labor costs continue to rise and quality becomes more and more important, automatic or semi-automatic control of foundry processes has become essential. Mulltrol exactly controls the length of the mulling cycle, assuring absolute batch uniformity and eliminating time-consuming, power-consuming overmulling.

Write now for full information to *Beardsley & Piper, Div. Pettibone Mulliken Corp., 2424 N. Cicero Ave., Chicago*

LOOK TO
BEARDSLEY & PIPER
FOR BETTER METHODS
BP
MEMBER FEMA

SHELL **BLOMATIC**

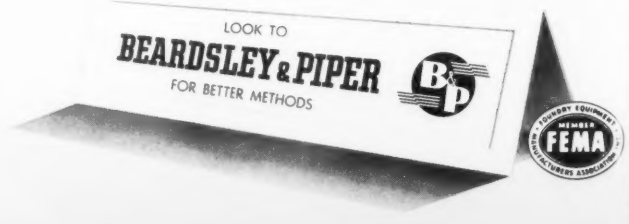
combining the speed and efficiency of blowing with the precision of the shell molding process

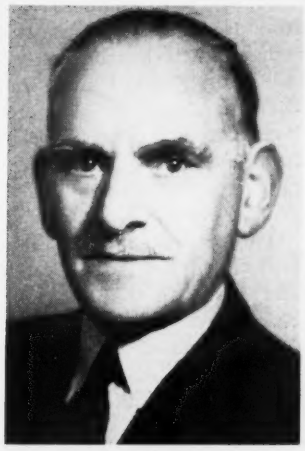


The new B&P shell Blomatic units now make possible the production of precision shell molds on a core blower type unit, with all of the speed and efficiency of the blower type of operation. In a shell Blomatic unit a B&P Champion blower replaces the sand box equipment used with B&P shell Formatic units. Instead of a rainfall of shell molding sand onto the pattern, sand is blown into a box. A few of the advantages of the shell Blomatic type of operation are:

1. Higher production.
2. Controlled contour of back of shell to permit use of clamp type pouring fixtures, eliminating backup material.
3. Thinner shells.
4. Simpler production cycle.

The shell Blomatic units feature the same unit package design of the shell Formatic units. A foundry may start with the simple components shown above—blower, curing furnace, and stripping unit—and later incorporate them in a complete rotary automatic unit. The cost of the simplest type of installation is only a small amount more than that required for very crude dump box installations. Yet, production cycles of two shells per minute are possible and the simple components offer all of the quality features so essential to successful shell molding. Write for full information. *Beardsley & Piper, Div. Pettibone Mulliken Corp., 2424 N. Cicero Avenue, Chicago 39, Illinois.*





JOHN BELL
President

DR. A. B. EVEREST
Senior Vice President

H. J. V. WILLIAMS
Junior Vice President

INSTITUTE of BRITISH FOUNDRYMEN

Holds Annual Meeting in Glasgow

By VINCENT DELPORT
European Manager

SCOTTISH sociability, the popularity of John Bell, president of the Institute of British Foundrymen for 1954-55 and the fact that Glasgow is the heart of industrial Scotland made the 51st annual convention of the institute one of the most notable of such gatherings since the war.

West of the city, the River Clyde flows to the sea. Not far out of the eastern gates of the city of Glasgow, one can delve into some of the most beautiful and picturesque regions of the British Isles.

In this setting, the conference began with the business meeting of the institute on June 23, E. Longden, outgoing president was in the chair. A note of sadness marked the opening when the chairman referred to the sudden death of Tom Makemson, who for 28 years had served the institute as its secretary and contributed greatly to its growth and worldwide influence by his integrity, his sense of duty, his friendliness and his helpfulness, particularly to young members.

The chairman then conveyed his

RECIPIENTS OF IBF AWARDS

FRANK ROWE, recipient of the E. J. Fox Medal, had three years apprenticeship in the patternshops and foundry, Metropolitan-Vickers Electrical Co., before studying metallurgy at Manchester University. He spent 20 years with David Brown Corp. as chief metallurgist, general manager and a director. Since 1943 he has been managing director, K. & L. Steelfounders & Engineers Ltd. Chairman of British Steel Founders' Association in 1951-52, Mr. Rowe is also a member of Council of the British Steel Castings Research Association.

D. H. POTTS, winner of the British Foundry Medal and Prize, was educated at Queen's College, Taunton, and subsequently served an engineering apprenticeship at Westinghouse Brake & Signal Co. Following military service he returned to the company in 1946 as assistant to the foundry manager, continuing studies at Bath Technical College. In 1950 he was made foundry engineer and later divisional foundry superintendent.

E. M. CURRIE, who was awarded the Oliver Stubbs Medal, began his foundry career as apprentice molder, Alfred Herbert Ltd., Coventry. Presently he is general manager-director, International Meehanite Metal Co. He was elected to membership in the IBF in 1918, and is a past president of its London Branch. He is a Fellow of the Institution of Metallurgists, a member of the Iron and Steel Institute, and also a member of the British Standards Technical Committee for Cast Irons.

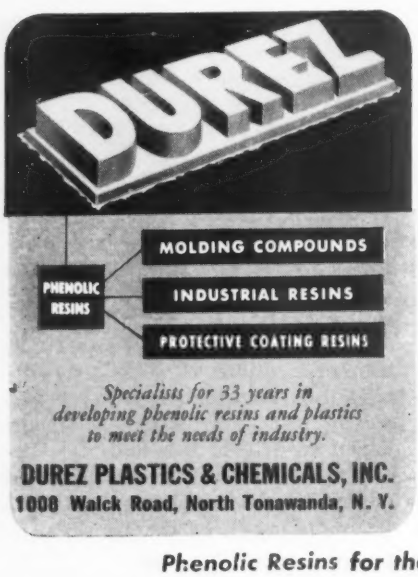
WILLIAM G. MOCHRIE, who received the Meritorious Services Medal, is London Manager, Tyseley Metal Works Ltd. He was educated at Battersea Polytechnic and the Sir John Cass Technical Institute. In 1935 he joined the smelting works of H. B. Barnard & Sons, London, and in 1938 was appointed metallurgist at Tyseley Metal Works, Birmingham, later becoming an inspector there. Mr. Mochrie joined the IBF in 1944 and since 1949 has been honorary secretary of its London Branch and has served on the General Council of the institute.

In the forward march of SHELL MOLDING 1954

1947 DUREZ RESINS set the pace!

Production efficiencies available to foundries and their customers through shell molding have depended from the beginning on the phenolic resins used to bond the sand.

Special resins had to be developed. As the largest producer specializing in phenolics exclusively, Durez has been in the forefront of foundry resin development from the beginning. Today Durez resins are widely recognized for their uniform quality, fast cure, and rigid set. All these are key properties in obtaining castings with desired structural strength, dimensional accuracy, and finish.


DUREZ
PHENOLIC RESINS
MOLDING COMPOUNDS
INDUSTRIAL RESINS
PROTECTIVE COATING RESINS
Specialists for 33 years in developing phenolic resins and plastics to meet the needs of industry.
DUREZ PLASTICS & CHEMICALS, INC.
1008 Walck Road, North Tonawanda, N. Y.

You may have decided to look into shell molding — to see how it can profit you. Or as a shell molder you may have questions that can be answered from our experience. In either case, Durez resin technicians are at your service. Just write.

What one foundry's customer says: "We have fewer rejects with these shell molded parts. The product has excellent uniformity—it meets our high standards of density and freedom from air bubbles or spaces that would interfere with electrical conductivity."

Phenolic Resins for the New Competitive Era

greetings to members and visitors from foreign countries, who included representatives from Belgium, Ceylon, India, Norway and Sweden. H. W. Dietert, Harry W. Dietert Co., Detroit, traveled from the United States to present, in person, the exchange paper contributed by the American Foundrymen's Society.

The presentation of the annual report disclosed that membership of the institute had attained, as of Apr. 20, 1954, the record number of 5295, including 251 from the South African branch and 183 from the Australian (Victoria) branch. The London branch, with four sections, also had outrun its previous record with 894 members.

Form New Subcommittees

The report of the Technical Council was presented by its chairman, A. E. Peace, Ley's Malleable Foundries, Derby. During the 12 months ended Apr. 30, 1954, three new subcommittees were formed, bringing the number of active ones during the year to 16. These sub-committees covered the following subjects:

Ingates, chairman, F. J. McCullock; internal stress, chairman, M. M. Hallet; flow of metals, chairman, E. M. Currie; cast iron tests and specifications, chairman, J. E. O. Little; copper-base alloy castings, chairman, F. C. Evans; mold drying, chairman, W. J. Colton; atlas of typical nonferrous microstructures, chairman, A. Logan; atlas of typical steel microstructures, chairman, C. H. Kain; atlas of typical cast iron microstructures, chairman, Dr. Brynmor Jones; cupola development, chairman, E. S. Renshaw; receivers, chairman, S. J. Sargood; nonferrous quality test, chairman, A. Logan; mold materials, chairman, J. Hird; foundry coke, chairman, D. Fleming; nonferrous surface finish, chairman, R. W. Ruddle; and feeding of castings, chairman, H. G. Hall.

The President then proceeded to the presentation of awards. E. M. Currie, International Meehanite Metal Co., London, past president of the London Branch, was awarded the Oliver Stubbs Medal "In recognition of his long and enthusiastic service to his fellow members in the practice and theory of foundry work and in particular of his energetic chairmanship of Technical Subcommittee T.S. 35."

Francis W. Rowe, managing director, K & L Engineers Ltd., Letchworth, received the E. J. Fox Medal "In recognition of his important contributions to foundry technology, particularly the technology of nonferrous castings and of steel cast-

ings."

Wm. G. Mochrie, Tyseley Metals Co., London, was awarded the Meritorious Service Medal "In recognition of his distinguished services as honorary secretary of the London branch, and of his valuable work for the Institute in many other directions."

The British Foundry Medal was presented by Barrington Hooper to Donald Hodgson Potts, Westinghouse Brake & Signal Co., Chippenham, for his paper on "Pressure Cast Aluminum Pattern Equipment."

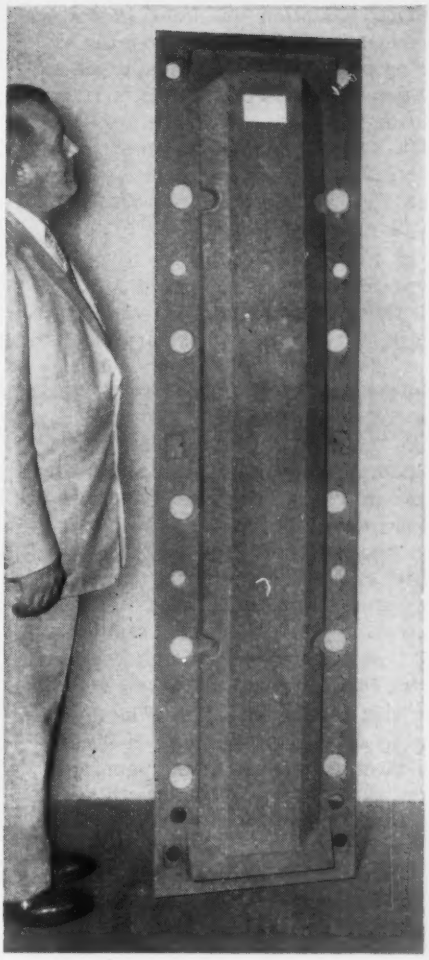
Diplomas were awarded to the following authors of papers read before branches during the past session or presented at the last annual conference:—E. Morgan for his joint authorship of the paper "Investigation on Dust Problems in Foundries," presented to the East Midlands Branch; D. Fleming for his paper "Inter-Relation of Combustion & Metallurgical Reactions in the Cupola," presented at the Blackpool Conference; A. Emerson for his paper "Shell Moulding of Cylinder Castings," presented to the London Branch; J. Langham for his paper "Propeller Manufacture," presented to the London Branch; C. M. G. Wallwork for his paper "An Approach to Foundry Mechanical Handling," presented to the Birmingham Branch; J. Burrell for his paper "Quantity Production of Engineering Castings," presented to the Lincolnshire Branch; and to J. Steele for his paper "Thermit Castings," presented to the South African Branch.

Officers Are Elected

Members then proceeded to the election of officers of the institute for 1954-55. John Bell, who had been honorary secretary of the Scottish Branch for 31 years, was elected president by acclamation. Dr. A. B. Everest, Research and Development Department, Mond Nickel Co., London, was unanimously elected senior vice president and will preside over the institute at the International Congress in London, in June, 1955. H. J. V. Williams, director of John Williams & Sons (Cardiff) Ltd., was unanimously elected junior vice president. President Longden then announced that George Lambert, formerly assistant secretary of the institute, had been appointed general secretary.

Five members were elected to two-year terms on the council. They are: E. M. Currie, London Branch; H. G. Hall, Birmingham Branch; M. M. Hallett, Sheffield Branch; R. L. Handley, Lancashire Branch; and A. E. Peace, East Midlands Branch.

KING SIZE shell molds ...point to profits with DUREZ SHELL MOLDING RESINS



Great interest centered on this shell mold when it was the largest on display at the 1954 Foundry Show in Cleveland. Standing well over 6 feet high, it is one of the molds used by the Arrow Pattern and Engineering Co., Erie, Pa., in casting a refrigeration part.

What this shows you is that Durez foundry resins extend the economies of shell molding into the field of really large castings. For standard commercial work our Durez foundry resin will help you produce smooth-surfaced, dimensionally accurate castings requiring very little or no clean-up. For tough, hard, warp-free shells which produce exceptionally fine castings, we supply a special Durez resin, outstanding in fast cure and rigid set.

Durez offers you more than a "team" of resins to suit individual job needs. Our experience in helping to solve shell molding problems covers a wide range—and it's at your service any time. Just write.

GET PRACTICAL POINTERS

DUREZ PLASTICS & CHEMICALS, INC.
1008 Walck Road, North Tonawanda, N. Y.

Put me on your list for "Shell Molding News."

Name .....
Company .....
Address .....
City and State .....

SHELL MOLD RESINS THAT FIT THE JOB

The induction of John Bell as president was performed by the retiring president, E. Longden, to whom a vote of thanks for his services during the past year, which was notable for the jubilee celebration of the institute, was proposed by Presiden Bell and seconded by Dr. C. J. Dadswell, past president.

In his presidential address, President John Bell referred to the jubilee of the institute and said that "the work we do now will in large measure determine what our institute will be like when another fifty years have gone." He said that between 1904 and 1954 many changes in foundry technique took place and that in a large degree these changes came about not because the foundry wanted them but because pressure came from outside the industry to do something in a wider interest. This pressure stimulated the endeavors of research workers who, each year, gave out their results.

"But," said Mr. Bell, "it is one thing to produce special metals in a laboratory and under laboratory control; it is a different thing to produce them on a foundry floor, where control is not so complete or so precise and where the economic background has a value quite unknown to our research-minded friends."

Here the speaker paid a special tribute to the institute's technical council, the work of which was a very important bridge between laboratory research and full economic production. He cited the present interest in shell molding as an example of industrial acceptance and application of earlier research work. He also emphasized the necessity of knowing how to use and apply in practice the principles and ideas arising out of research work.

Referring to the prominence now being given to productivity, Mr. Bell said the term does not mean only "so many molds per hour"; such a goal may exist in semi-mechanized and fully mechanized work, but much work still requires the skill of the craftsman. In this class of work, there can be no trial castings, for "the first one must be right."

Later the president stated, "If theory and practice are equally desirable and if both must be learned in the formative years of a man's life, then it would appear that training in both should go hand in hand." He laid stress upon the importance of design and its relation to turning out sound castings on an economic basis. He pointed out that outside their own industry, the views of foundrymen on design requirements in relation to castings seldom are heard and even less frequently heeded. He concluded by saying, "Would it be inappropriate if the institute, through its technical council or some other committee, were to prepare and issue a publication (or textbook) dealing with important points of design? Perhaps at the beginning of our second period of fifty years, the time for this idea has come."

The morning session ended with the Edward Williams Lecture, entitled "Engineering Research Methods and Casting Problems," by Prof. A. W. Scott, Department of Civil and Mechanical Engineering, Royal Technical College, Glasgow. The lecturer stressed the necessity for closer co-operation between the engineer and the foundryman, thus falling in line with thoughts expressed by the president in his address. He said that improvement in design must go hand in hand with improvement of casting processes.

He referred to the making of a propeller as an example where the strength indicated by a test bar taken from the metal often varies from the results obtained in service. The engineer could improve his design if he knew more of the intricacies involved in the casting of metals. Many problems are common to the engineer and to the foundryman. The lecture dealt mainly with problems of heat transfer and with strains in castings resulting from differential cooling rates, differences of thicknesses, certain shapes and contours and other factors. Methods of investigation used by engineers, some of recent date, were described in some detail, and it was suggested that they could be employed usefully by the foundry industry.

Fifteen papers were presented at the convention. Reports on these papers will appear in the next issue of FOUNDRY.

IN APPRECIATION: Charles T. Milles, president, C. H. Milles Foundry Co., Chicago, and Campbell V. Adams, works manager, Vulcan Iron Works, Chicago, long-active members of the Chicago Foundrymen's Association recently were presented with testimonial plaques "in appreciation of many years of devoted and unselfish efforts toward the advancement of the foundry industry in all its phases." Both are directors of the group and Mr. Adams has been secretary-treasurer for many years. Left to right, Carl A. Larson, Reliance Pattern Works, association president; Mr. Adams; Robert D. Phelps Jr., Francis & Nygren Foundry Co., association past president; and Mr. Milles. Photo by J. R. Shumway, C. W. Shumway & Sons

Publishes New Book on Aluminum Welding

In a new 176-page manual the Aluminum Co. of America has given basic information on all of the practical methods for welding aluminum. The book, entitled *Welding Alcoa Aluminum,* lists factors to consider in selecting a welding method, includes a chapter on each of six welding methods and describes the welding of aluminum alloy castings. Quality control, safety, and performance of welds are other topics discussed. A final section of 32 tables gives important data on welding aluminum.

Information on the physical properties of aluminum alloys, alloy compositions and strengths of certain type welds is given. Edge preparation is described by dimensioned drawings for most welding methods.

Copies of the book are available from Aluminum Co. of America, 733 Alcoa Bldg., Pittsburgh 19, Pa.

YOU NEED THE BEST CORE WASH

Buy MEXADIP™

- **MEXADIP WILL NOT FERMENT.** You will not have to dump your wash because of hot humid conditions — no pock marks or pitted coating surfaces with MEXADIP.

- **MEXADIP STAYS IN SUSPENSION.** Let it stand over the week end, it will be ready to go Monday morning.

- **MEXADIP WILL NOT RUN, BUILD UP OR RUB OFF.** It applies equally well on either green or baked cores.

- **MEXADIP IS DEPENDABLE AT ANY BAUME.** It is applied daily to cores for thousands of tons of castings over a range of 10-40 degrees Baume.

- **MEXADIP REQUIRES NO LONG "PASTE" MIXING.** No waiting period is necessary. Just add the powder to water and after a few minutes of stirring it is ready to go.

IMPROVE CASTING APPEARANCE AND SAVE MAN HOURS IN THE CLEANING ROOM. If you have a problem with core wash, MEXADIP will solve it. Ask us to arrange a test today.

WRITE FOR THIS FREE BOOKLET

Write for this free illustrated Engineering Bulletin No. 17 giving complete information about the complete line of United States Graphite Core and Mold Washes for all ferrous and non-ferrous foundry practice. Includes comprehensive chart describing methods of application.

Why wait . . .
Start now — Use MEXADIP™

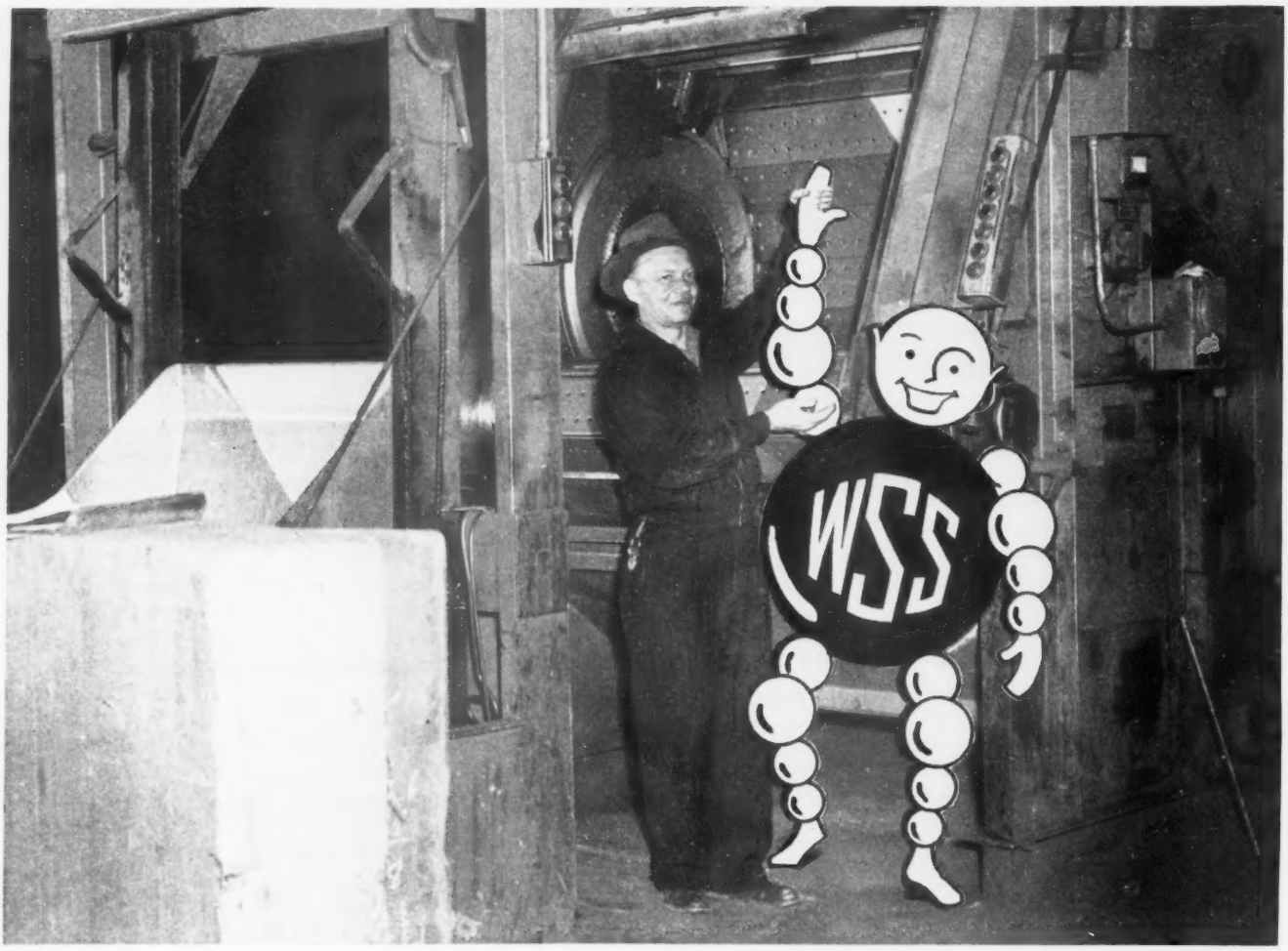
168

OUR 100th YEAR

THE UNITED STATES GRAPHITE COMPANY

DIVISION OF THE WICKES CORPORATION • SAGINAW, MICHIGAN

pioneering developments keep **WHEELABRATOR® STEEL SHOT** *first in abrasives*



The Winner . . and New Champion, Wheelabrator® Steel Shot

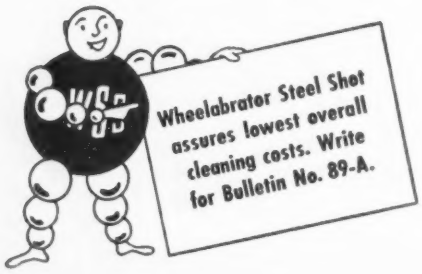
Scores Easy Victory in Blast Cleaning Performance at Swayne, Robinson & Co.

Scoring a 56.6% decrease in blast cleaning abrasive costs, Wheelabrator Steel Shot proved its superiority over a malleable iron abrasive at Swayne, Robinson & Co., Richmond, Indiana in cleaning gray iron castings. As a result of the cost-slashing performance of this superior electric furnace steel shot, an abrasive saving of 86.8c was effected in cleaning every ton of castings.

These additional benefits further established Wheelabrator Steel Shot as the abrasive champion at Swayne, Robinson & Co. With its faster cleaning action, a reduction of three hours daily in the use of their Wheelabrator Tumblast was possible. Casting tonnage which had formerly required seven hours cleaning time is now Wheelabrated in just four hours.

Maintenance labor and machine wear were reduced, effecting additional savings. Quality of cleaning was greatly improved making possible the elimination of tumbling mills formerly used for desired surface appearance of certain types of castings.

Results like these can be duplicated in your cleaning room, too. Wheelabrator Steel Shot is produced under the most rigid controls to provide a metallurgically superior steel shot of uniform quality for the maximum economy in blast cleaning. It will clean faster at lower cost than any other abrasive. Try it and prove it for yourself.



American
WHEELABRATOR & EQUIPMENT CORP.
505 S. Byrkit St., Mishawaka, Indiana

WHEELABRATOR STEEL SHOT

AROUND THE COUNTRY

NEWS REPORTS FROM

Philadelphia
New York
Chicago
Los Angeles

Philadelphia . . .

JULY foundry operations here will prove to be the lowest so far this year. Suspensions for mass vacations, hot weather and a further limitation in demand (casting consumers, as well as foundries, being affected by seasonal influences) will contribute principally to this lag. August operations may show a slight improvement, but most foundrymen believe there will be no material pickup until after Labor Day.

Gray iron jobbing shops have backlogs averaging around a week to ten days. When not down for vacations, some are operating five days a week, with limited working forces. Others, and perhaps the minority, are unable to do better than four days a week.

Pipe shops are doing very well, and foundries producing castings for paper making machinery are doing fairly well. Otherwise, the situation is spotty. Textile machinery business, normally one of the better machinery items in this district, is relatively slow.

Business with steel foundries has leveled off at around 65 per cent of normal, with foundries averaging five days a week on a restricted basis. For instance, some steel foundries are operating only seven hours a day and in some cases even less. Backlogs average four to five weeks.

Demand for malleable pipe fittings is holding up well, but in other malleable lines business is only moderately good. Shops are operating five days a week, but with less than full working crews. However, backlogs average five to six weeks.

Brass shops are running four to five days a week, with little outstanding demand in any direction.

New York . . .

GRAY iron shops are operating three or four days a week and in some instances even less. Business is the slowest so far this year, reflecting seasonal conditions, and the general expectation is there will be no substantial pickup before September, at least.

Malleable and steel casting shops continue to do better than the gray iron foundries. However, their business also is down, as a partial result of vacations and warm weather. Operations run around five days a week, with limited working forces, and backlogs five weeks, the latter comparing with a week to ten days for most gray iron shops.

Demand for water meters is outstanding among the brass shops. Captive plants engaged in this work are now experiencing an overflow and in some instances have sublet business to other foundries. Marine work is very quiet and valve and pump people report a definite falling off. Operations at aluminum foundries are spotty. Those engaged in government work, particularly for aircraft, are still busy, though backlogs are less extended. Those relying on commercial business are having to scratch hard to keep operations at five days a week.

Chicago . . .

NATIONAL Malleable & Steel Castings Co., Cicero, Ill., isn't launching a rocket—it is merely installing

a recuperator and dust collector on its two cupolas. It is being built by the Grindle Corp., Harvey, Ill., and represents an expenditure of close to $250,000. Basically, it is a duplicate of an installation made at National Malleable's Indianapolis plant some 18 months ago. The setup has not only reduced smoke and dust from the cupolas by 85 per cent, but also has increased melting rate by 20 per cent. The unit is of the dry collector type. The recuperator, or heat exchanger, makes use of exhaust gases to heat blast air. Over-all height is 140 ft. Bottom portion is 18 ft diameter and the 62 ft stack is 6 ft diameter. Braces used on the stack in lieu of guy wires give the "rocket" effect.

Los Angeles . . .

WITH foundry activity for the first half of the year surpassing all previous expectations, optimism increased further as melters resumed full production after mass vacations slowed output in most shops during July. During the vacation periods foundrymen overhauled their shops and re-examined production schedules. Most of them feel that the mass-vacation practice, increasingly popular in western industry, is here to stay.

Melting rates climbed rapidly to full capacity in most shops soon after the vacations, with little evidence seen of the usual summer slack. Few foundries are operating at less than 85 per cent. All shops are working five-day weeks and overtime is becoming the rule.

The steady climb in activity is reported by both ferrous and nonferrous foundries. Backlogs range from six to eight weeks, with one foundry whittling away at a 12-week backlog involving a special order.

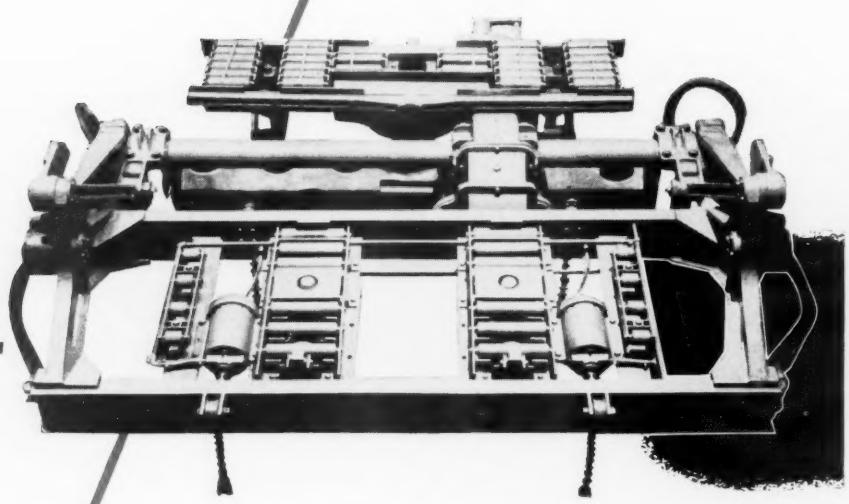
Inquiries from casting users in July were about 15 per cent more numerous than in the two preceding months, giving confidence that the heavy activity will be sustained. A large consumer of castings, reporting his business has never been better, estimates that his requirements will increase substantially throughout the summer and fall. Other casting users are increasingly confident that their orders will continue to grow.

The rise in steel prices stemming from the recent wage increase has not yet affected the level of casting prices. Although foundrymen generally agree that ferrous casting prices will increase with rising labor costs, they deny any possibility of an immediate wage increase in their shops. Most union contracts won't be reopened for several months, and the belief in this area is that casting prices will remain at their current level at least until labor costs rise again. The steel increases will have little effect, say foundrymen.

Another HERMAN

These comparatively new Herman Charging Conveyor Type Machines are extremely popular, whether operated in molding departments or core departments. They work equally well with either a Jolt machine or Sandslinger.

A versatile, rugged machine, it is produced in our broad range from 500 to 20,000 lb. rollover capacities.



Here is one unit in the complete line of HERMAN Molding Machines, in all types and sizes, to fit all foundry operations.

HERMAN MOLDING MACHINES MAKE

at work

A typical core department cycle of operations is as follows:

1. Core box filled with sand and placed on the jolt unit.
2. Power lift conveyor lowers box on sub-plate.
3. Core box is jarred and elevated by power lift conveyor to standard conveyor level.
4. Box goes to Charging Conveyor Rollover and Draw Machine, manually or by pusher mechanism.
5. Pneumatic core box and core plate clamps engage rammed core box for rollover operation.
6. After rollover, core clamps are disengaged and slow draw operation starts.
7. Vibrators separate bond between core box and sand.
8. Fast draw operation checked by speed control device and core box gently deposited directly on discharge conveyor and rolled away on companion conveyor.
9. Inverted turnover plate and core box rolled back to upright position, pneumatic clamps disengaged and box returned to either jolt station or storage.
10. Another rammed core box should, of course, now be at the Charging Conveyor Rollover and Draw Machine for the production of another core.

Herman Charging Conveyor Rollover and Draw Machines are extremely flexible. Each machine is capable of producing a large range of sizes in either your molding or core department.

Send for further information today.

There is a type and size Herman Molding Machine for all foundry operations.

Here is the HERMAN Charging Conveyor Rollover and Draw Machine

"Here at Howard we have found our Herman Charging Conveyor Rollover and Draw Machines to be the ideal answer to our production requirements. We find their versatility particularly adapted to the fast production of miscellaneous cores and molds.

We cut our costs by reducing idle machine time to a minimum, since these Herman machines operate in separate locations from their companion Herman Charging Conveyor Jolt Machine. Therefore, ramming, rollover, and draw operations are performed simultaneously. Flexible clamping arrangements enable an individual machine to produce a broad range of sizes in regard to both length and depth of molds and cores.

The dependability, ruggedness, and quality engineering of the Herman Charging Conveyor Rollover and Draw Machine are plus factors which make it a favorite in our foundry."

Howard Foundry Company,
Magnesium Division,
Chicago, Illinois

THEIR WAY BY THE WAY THEY'RE MADE

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

Herman MOLDING MACHINES

HERMAN PNEUMATIC MACHINE CO., UNION BANK BUILDING, PITTSBURGH 22, PA.

Herman MOLDING MACHINES

HERMAN PNEUMATIC MACHINE CO., UNION BANK BUILDING, PITTSBURGH 22, PA.

Gray Iron Founders Meet in California

Left to right: Gordon Martin, Atlas Foundry & Mfg. Co., Richmond; Al Sanchez, Vulcan Foundry Co., Oakland; Don Workman, executive vice president, GIFS; Al Renfrow, Renfrow Foundry, Los Angeles; H. J. Trenkamp, Ohio Foundry Co., Cleveland; Earl Paltenghi, H. C. Macaulay Foundry Co., Berkeley; Charlie Gregg, Gregg Iron Works, El Monte. Photograph of the group is through the courtesy of Sam Russell, Phoenix Iron Works, Oakland, Calif.

OVER seventy northern and southern California gray iron foundry executives and their wives attended a regional meeting at Carmel, Calif., June 11-13. The La Playa Hotel was headquarters for this initial California regional management gathering.

Gordon Martin, vice president, Atlas Foundry & Mfg. Co., Richmond, served as general chairman, representing the hosts, the Northern California Management Group of Gray Iron Founders' Society. Other Northern California officers are Earl Paltenghi, H. C. Macaulay Foundry Co., Berkeley, chairman, and Al Sanchez, Vulcan Foundry Co., Oakland, secretary. Southern California officers attending were Al Renfrow, Renfrow Foundry, Los Angeles, president, and Charlie Gregg, Gregg Iron Foundry, El Monte, secretary.

Guests at the meeting were H. J. Trenkamp, the Ohio Foundry Co., Cleveland, president, Gray Iron Founders' Society; Don Workman, executive vice president of the society, and Roy Paulsen, GIFS regional cost group consultant, Davenport, Iowa.

Following a dinner party in Monterey Friday evening, business sessions were conducted all day Saturday. After introductions and remarks from society and group officers the foundrymen concentrated on a discussion and review of current foundry management problems. Included was a review of operating statistics, air pollution, foundry costs, and a review of the current GIFS program evaluation activities. An active question-and-answer period on foundry problems concluded a most worthwhile meeting.

The meeting was concluded with a reception and banquet Saturday night. Because of the enthusiasm and success of this regional get-together, the Southern California foundrymen have invited their neighbors to the North to be their guests at a similar meeting early this fall.

Bentonville Casting Co., Bentonville, Ark., has completed a foundry building and is installing equipment preparatory to early production.

Meetings of Interest to Foundrymen

Sept. 13-20—Instrument Society of America, International Instrument Congress and Exposition, Convention Hall and Commercial Museum, Philadelphia

Sept. 21-23—Society for Experimental Stress Analysis, annual meeting and exhibition, in conjunction with first International Instrument Congress and Exposition, Bellevue-Stratford Hotel, Philadelphia

Sept. 27-28—Steel Founders' Society of America, fall meeting, the Greenbrier, White Sulphur Springs, W. Va.

Sept. 28-Oct. 1—Iron and Steel Exposition, Association of Iron and Steel Engineers, Cleveland Public Auditorium, Cleveland

Oct. 6-8—National Foundry Association, 56th annual meeting, La Salle Hotel, Chicago

Oct. 14-15—Michigan Regional Foundry Conference, University of Michigan, Ann Arbor, Mich.

Oct. 14-16—Foundry Equipment Manufacturers' Association, annual meeting, the Greenbrier, White Sulphur Springs, W. Va.

Oct. 18-22—National Safety Council, 42nd National Safety Congress and Exposition, Chicago

Oct. 27-29—Grinding Wheel Institute & Abrasive Grain Association, fall meeting, Edgewater Beach Hotel, Chicago

Oct. 28-29—Purdue Metals Casting Conference, Purdue University, Lafayette, Ind.

Oct. 29-30—New England Foundrymen's Association, New England Regional Foundry Conference, Massachussets Institute of Technology, Cambridge, Mass.

Nov. 1-5—American Society for Metals, National Metal Congress and Exposition, International Amphitheater, Chicago

Nov. 10-12—Industrial Management Society, 18th annual time and motion study and management clinic, Sherman Hotel, Chicago

Nov. 11-12—Gray Iron Founders' Society, annual meeting, the Homestead, Hot Springs, Va.

Dec. 1-4—American Institute of Mining & Metallurgical Engineers, electric furnace steel conference, Hotel William Penn, Pittsburgh

1955

Mar. 28-Apr. 1—American Society for Metals, ninth Western Metal Congress and Western Metal Exposition, Pan-Pacific Auditorium, Los Angeles

June 16-18—Malleable Founders' Society, annual meeting, the Greenbrier, White Sulphur Springs, W. Va.

BENTONITE as you like it!

Black Hills 80. Granular; produced to the lowest possible dust level to eliminate loss at the muller. For maximum efficiency with systems which include fines-removal equipment.

Black Hills Slurry Grade. Coarser than our 80-fineness grade; recommended for rapid dispersion and maximum efficiency in water when clay is added to sand as a slurry.

BLACK HILLS BENTONITE pulverized or 200-mesh. Selected by foundries generally for rapid mulling. Strong, uniform, dependable.

BLACK HILLS BENTONITE

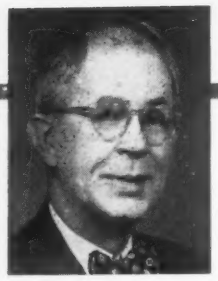
Minerals International Chemicals

EASTERN CLAY PRODUCTS DEPT.

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

General Offices: 20 North Wacker Drive, Chicago, 6

DIXIE BOND • BLACK HILLS BENTONITE • TRIPLACT • REVIVO CORE PASTE • REVIVO BOND • BONDACTOR • CUPOLINE • DURA PRODUCTS • WESTONITE



MAN-TO-MAN

By RALPH L. LEE

Mechanization + Humanization

"We should recognize that the ability of the individual, properly encouraged, sparked, rewarded and recognized, is practically limitless"

SOME time ago, the president of a very fine foundry laid out the red carpet for me, (so to speak) when I visited his plant. I felt very much honored and somewhat embarassed that he should make so much fuss over the old amateur, knowing what a figure he was in foundry circles and of the many splendid contributions he had made to the industry.

With becoming modesty he did a darned good job of telling about the growth and accomplishments of his gang. In going through his plant I could see that the organization was awake to the development of modern equipment, layouts and processes, but the funny thing was that he seemed to try to hurry me past any number of new things I had read about, but had never seen, to what he considered were really good things he had up his sleeve.

One of these prizes turned out to be a snagger. I swear that this fellow was really something to write home about. I had never seen anything like him at work before in my life. As we quietly slipped up behind this fellow, who was working before his wheel, the small castings he was grinding seemed literally to jump from the tote box which held them into his hand, against the wheel and into the receiving box, in one steady stream.

I knew that the fellow was not showing off or putting on an act, for he couldn't have seen us coming, and he wasn't giving the castings a lick and a promise either. I picked out some at random later and looked at them carefully.

My host greeted him and introduced him to me in a manner which indicated just as plain as words that he knew I would be glad to meet such an outstanding and distinguished snagger of castings. And he was right. I *was* glad, for I had never seen anything half his equal. There was a man who had made a distinguished career out of work which to most people would have been just one big pain in the neck or a sentence to be served for the privilege of eating.

I can't remember the figures as to the quantity of work this genius was turning out, but my host told me that far from being an exhibit for visiting firemen, the man paid for his keep many times over, in spite of fat take-home pay, not only by his terrific output, but also by the example he set for the rest of his gang. I couldn't help wondering how I would have gone about building a machine to take his place, how much it would have cost and how it would have worked out with all the kinds and quantities of work they had in that plant.

The next prize showpiece of the trip was a jolt-squeeze job, without aid of conveyor or sand system, which I recognized as identical to one I had seen in another foundry, rigged up with permanent molds on a pseudo-automatic setup. When I mentioned this, my host, with expanded chest, told me that I was right and that his gang was competing successfully with that superduper bit of automation.

After that, on the route we took through the plant, it became obvious that my host and his gang took particular pride in matching the practiced skill and ingenuity of the individual against mechanization or automation. Even to imply that this outfit, like Don Quixote, was fighting windmills and carrying pride to a ridiculous extreme would have been a rank injustice, for, from what I could see, those folks knew the facts of life as far as economics were concerned.

I feel quite sure that they hadn't missed many bets in the area of modernization (they had a preheated blast, for example), but they did recognize that the ability of the individual, properly sparked, encouraged, recognized and rewarded, is practically limitless. I must say that I got a tremendous bang out of the visit. It seemed to back up a growing suspicion I had had for many a year that no matter how carefully they are computed, the standards set up for flexing muscles against distance and time by the time and motion study cult fail to take into account the unpredictable and frequently amazing performance of human beings who are sparked and fired with the will to do.

It seems to me that the trigger or the catalyst for releasing this tremendous production multiplier is a recognition that all posts in a foundry organization should be filled with career people, folks who have found in their work not only a means of earning a living, but also a reason for living.

It takes real talent to make a distinguished sweeper, something more than condescending to stoop to do the job, for there are many who couldn't do it as it should be done, even if they wanted to and tried. I personally have met any number who have distinguished themselves at this humble craft to a point of earning the respect of their entire outfits—they had talent, not just endurance.

It takes talent, it seems to me, to fill every post in the foundry with people who can and will make careers out of their jobs, and although perfection in any effort never can be more than a dream, pecking away in this direction can do a lot for an organization. Of course, dealing with career people is an entirely different breed of cats from dealing with hired help. Career people need recognition and an appreciation of their accomplishments and dependability. And most career people have a touch of the opera star in them which calls for some allowances to be made for them now and then.

Well, anyway, I think that with all the emphasis now being placed upon the mechanization of foundries, it might not be a bad idea to consider along with it the possibility of more humanization with an eye on the almost limitless possibilities of what an organization's members can do if they feel like cutting loose and have an assurance of credit and respect. There was a time when I would have been darned self-conscious belaboring this theme or playing on this string, but not any more. I have seen too many rabbits pulled out of hats.

"One unit pays for the next"

KEEN FOUNDRY COMPANY reorders

Handy Sandys 3 TIMES

Mr. Lou Keen, President of Keen Foundry Co., Griffith, Indiana, states: "We've invested in five Newaygo Handy Sandys in less than a year for several reasons. First, these individual Sand Handling Units are very adaptable to the physical characteristics of our foundry. Second, their great flexability gives us overhead sand stations at any point in the foundry without costly remodeling. Third, Handy Sandys require low capital investment."

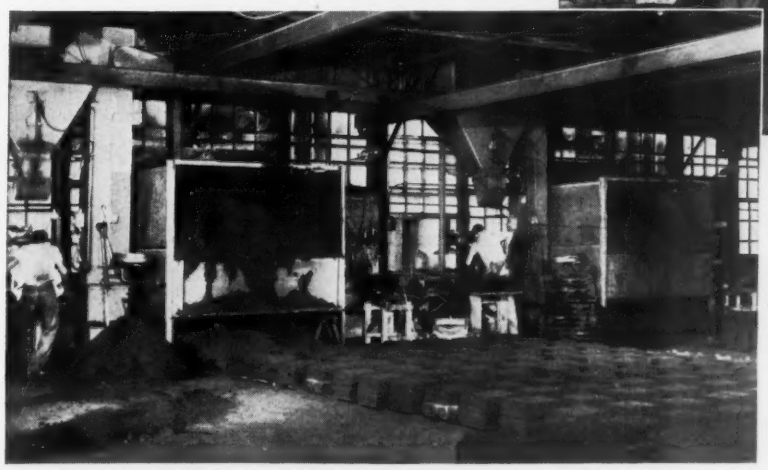
"Naturally, the proof of the equipment's value to us is its performance. Since installation we have, in one section of our foundry, conservatively increased mold output by over 25%. In another section, in conjunction with a change in molding procedures, we are still maintaining the same mold production over a six hour period, but we are getting twice as many castings per mold."

"We also figure the molder's fatigue factor has been decreased by 50%. Before Handy Sandys the average molder shoveled about 15 tons of sand per day; now he uses the shovel for occasional cleaning up around the molding machine."

Keen Foundry Co., a grey iron production operation, manufactures castings for electric hoists, gas pumps, engines, pressure valves, air compressors, machine tools and other industries. Castings weigh from 5 lbs. up to 100 lbs. each, and the flasks used with the Handy Sandys vary from 18" x 18" to 24" x 30".

Three of these Newaygo units operate in conjunction with Osborne Rotolifts averaging about 120 molds per unit in a 6 hour period. On this job each mold has 8 castings and 4 cores. Molds are set out by molder using overhead crane hoist.

The lower sand bins and boot of elevators are sunk 3 feet into the floor almost tripling the sand capacity of each Handy Sandy Unit.



Showing two Handy Sandys over squeezer work. These units produce over 140 molds each in a six hour period. Molds are set out by operators who also handle pour off.

Sand bins on all five units are supplied from a central sand system by a Payloader.

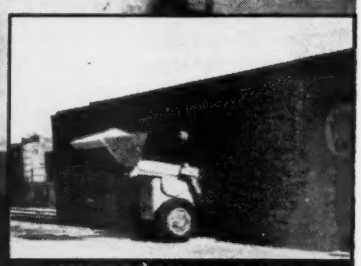
A copy of "Planned Mechanization for Foundries" is yours for the asking. Write, wire, or phone

NEWAYGO engineering company
NEWAYGO, MICHIGAN
Manufacturers of Newaygo® Mold Handling, Sand Handling and Conditioning Equipment

Handles Them All

Sand, Slag, Scrap, Barrels Kegs, Castings, Waste, Bags

CARRYING CASTINGS



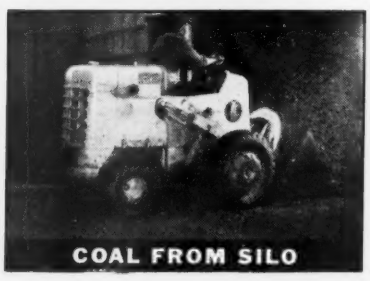
UNLOADING BOXCAR

SAND TO MOLDERS

You get your sand-handling operations into high gear when you put "PAYLOADERS" to work. These high-speed tractor-shovels put the skids under sand handling *costs* too. And they are so versatile that they handle many other jobs as well. One man on a "PAYLOADER" can scoop, shovel, carry, load, unload, pile and spread . . . push, pull and lift . . . indoors or outdoors.

It will pay you to find out what these unusual machines are doing for other foundries and determine the model and size that fits your needs. Your "PAYLOADER" Distributor is ready with the facts. The Frank G. Hough Co., 703 Sunnyside Ave., Libertyville, Illinois.

JOB STUDIES are available on request, covering operations in several different plants.



COAL FROM SILO

YOU CAN'T COMPETE IF YOUR EQUIPMENT IS OBSOLETE

SAY "HUFF"

PAYLOADER®

THE FRANK G. HOUGH CO. · Since 1920

Proposed Tentative Specifications for
Nickel-Tin Bronze Castings

ASTM Designation: B—54T

Issued, 1954

Scope

1. (a) This specification covers castings for two alloys whose classifications and nominal compositions are shown in Table I.

Table I—Nominal Compositions

Classification		Copper per cent	Tin per cent	Nickel per cent	Lead per cent	Zinc per cent
Nickel-Tin Bronze	As cast—Alloy A	88	5	5	..	2
	Heat treated—Alloy A	88	5	5	..	2
	Leaded—Alloy B	87	5	5	1	2

(b) Castings of alloy A may be heat treated to develop high strength or hardness. Castings of these alloys are used for constructional or pressure purposes; for example, machinery frames, gears, cams, switch gear, electric line hardware, bushings, pumps, valves and cylinders.

Basis of Purchase

2. Orders for materials under this specification shall include the following information:

(1) Alloy (Table I),

(2) Tests for certification required (Sections 5, 10, 15), and

(3) Marking, if required (Section 13).

Manufacture

3. (a) The alloy may be made by any approved method.

(b) The castings shall be made in accordance with such practice as to obtain the physical properties prescribed in this specification.

(c) The castings shall be of uniform quality.

Table II—Chemical Requirements

	Alloy A		Alloy B	
	Min.	Max.	Min.	Max.
Copper, per cent	85.0	90.0	84.0	89.0
Tin, per cent	4.5	6.0	4.5	6.0
Nickel, per cent	4.5	6.0	4.5	6.0
Lead, per cent	...	0.10[a]	..	1.0
Zinc, per cent	...	2.5	..	2.5
Impurities				
Iron, per cent	...	0.25	..	0.25
Manganese, per cent	...	0.20	..	0.20
Antimony, per cent	...	0.15	..	0.15
Others, per cent	...	0.25	..	0.25

[a] The mechanical properties of alloy 4 in the heat-treated condition may not be attained if the lead content exceeds 0.01 per cent.

Chemical Composition

4. The castings shall conform to the requirements as to chemical composition prescribed in Table II.

Chemical Analysis

5. (a) An analysis of each melt may be required at the option of the purchaser.

(b) The sample for chemical analysis shall be taken by drilling or cutting the test coupon or sprue in such a manner as to be representative of the entire cross section.

Methods of Chemical Analysis

6. Analyses, when made, shall be performed in accordance with the Standard Methods for Chemical Analysis of Special Brasses and Bronzes (ASTM Designation E 54).

Tensile Properties

7. The material shall conform to the requirements as to tensile properties prescribed in Table III.

Table III—Tensile Requirements

Classification		Tensile Strength min. psi	Yield Strength[a] min. psi	Elongation in 2 in. min. per cent
Nickel-Tin Bronze	As cast—Alloy A	45,000	20,000	25
	Heat treated—Alloy B	75,000	50,000	5
	Leaded—as cast—Alloy B	40,000	20,000	20

[a] Yield strength shall be determined as the stress producing an elongation of 0.5 per cent under a load that is, 0.01-in. in a gage length of 2 in.

Test Coupons and Specimens

8. The tension test coupons and specimens for tension tests shall be prepared in accordance with the Recommended Practice for Tension Tests Specimens for Copper-Base Alloys for Sand Castings (ASTM Designation B 208).

Number of Tests

9. (a) Three test coupons shall be poured from each melt of metal, or such groups of melts as the purchaser may specify, but in no case shall a lot consist of more than 1000 lb of castings, except if individual castings weigh more than 1000 lb. The inspector shall witness the pouring of the test molds.

(b) If any test specimen shows defective machining or reveals casting defects, it may be discarded and replaced by another specimen selected by the inspector.

(c) The specimens shall be made and tested at the expense of the manufacturer. The inspector shall witness the testing.

(d) One specimen shall be tested. If the physical requirements are met by this one test, the lot shall be accepted. If the first specimen fails to conform to the requirements specified, the two remaining specimens shall be tested. If the average properties of the two remaining specimens conform to the requirements specified, the lot shall be accepted.

Methods of Testing

10. The tension tests shall be made in accordance with the Methods of Tension Testing of Metallic Materials (ASTM Designation E 8).

Significance of Numerical Limits

11. For purposes of determining compliance with the specified limits for requirements of the properties listed in the following table, an observed, or a calculated value, shall be rounded off as indicated in accordance with the rounding-off method of the Recommended Practices for Designating Significant Places in Specified Limiting Values (ASTM Designation E 29).

Property	Rounded-off Unit for Observed or Calculated Value
Chemical Composition	Nearest unit in the last right hand place of figures
Tensile Strength Yield Strength	Nearest 1000 psi
Elongation: 5 per cent and over	Nearest 1 per cent

Workmanship and Finish

12. (a) The castings shall be free from blowholes, porosity, hard spots, shrinkage defects or cracks, or other injurious defects and shall be smooth and well cleaned, before inspection, by sand blasting, tumbling, chipping, or other process approved by the inspector.

(b) The castings shall not be repaired, plugged, welded, or "burned in", unless permission from the inspector has been previously secured. This permission will be given only when the defects are such that after the approved repair the usefulness and strength of the casting has not been impaired. Each such repair shall be encircled by a ring of white paint at the time of shipment.

(c) All castings shall be true to pattern, free from swells, etc. Wall thicknesses shall be uniform throughout the lot of castings and all cores shall be accurately set.

(d) Where thick and thin sections join, the manufacturer shall be permitted to add (where not previously provided) fillets of proper size to avoid cracking upon cooling, subject to approval of the inspector.

(e) The manufacturer shall not be responsible for the dimensional accuracy of patterns supplied by the purchaser.

Marking

13. Upon request of the purchaser, castings shall be marked with the pattern or mark number at a position on the castings where it will not be machined off in manufacture to finished dimensions.

Inspection

14. (a) Inspection may be made at the manufacturer's works or at the place of delivery. Inspection shall be made at the option of the purchaser.

(b) If the purchaser elects to have the inspection made at the manufacturer's works, the inspector representing the purchaser shall have free entry, at all times while work on the contract of the purchaser is being performed, to all parts of the manufacturer's works that concern the manufacture of the material ordered. The manufacturer shall afford the inspector, without charge, all reasonable facilities to satisfy him that the material is being furnished in accordance with this specification. All tests and inspection shall be so conducted as not to interfere unnecessarily with the operation of the works.

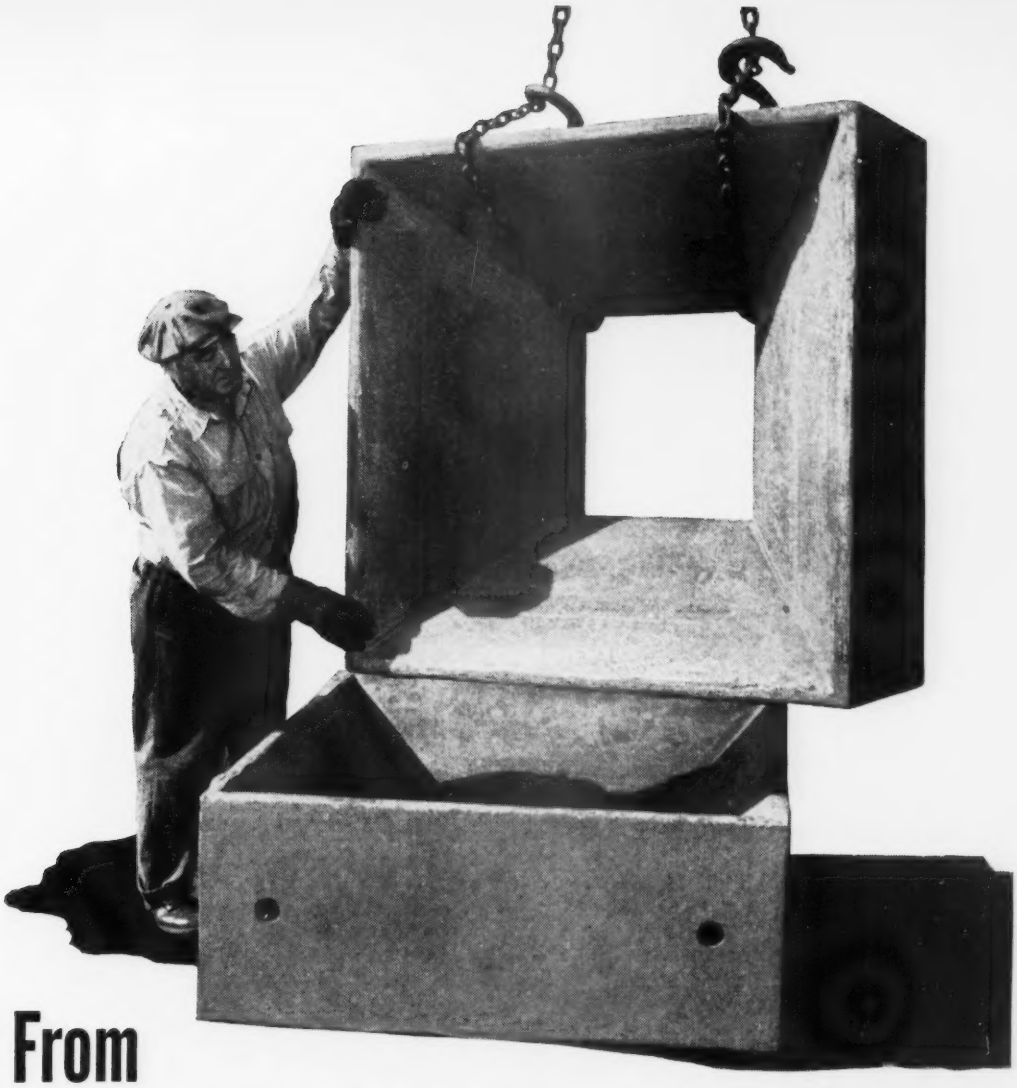
Certification

15. In the case of a product manufactured in advance and supplied for sale from stock by the manufacturer, jobber or other dealer, the product may upon request of the purchaser be certified by the manufacturer as conforming to this specification subject to the following procedure: Not less than two tension tests, from different heats, and not less than one chemical analysis shall be made by the manufacturer from each day's melt. Records of the tension test results and chemical analysis shall be systematically made and maintained and shall be the basis for certification. In lieu of the manufacturer's certification and upon written request by the purchaser, these records may be examined by the purchaser or his accredited representative upon the manufacturer's premises.

Rejection

16. Castings that show injurious defects revealed by machining operation subsequent to acceptance may be rejected, and if rejected, the foundry shall be notified within 30 days. The full weight of the original material rejected shall be returned to the foundry. The foundry shall not be responsible for the costs of machining defective castings.

Additional copies of th's specification may be obtained from the American Society for Testing Materials, 1916 Race St., Philadelphia 3, for a nominal sum.



Chills Cast From Chateaugay Pig Iron Resist Heat at 3400°F

Casting surfaces resistant to heat and corrosion are extremely important to Dobbie Foundry & Machine Company, Niagara Falls, N. Y.

The casting illustrated is a chill or trough. It is used to direct the flow of molten chromium into molds. The casting surfaces must withstand temperatures over 3400° F.

To obtain surfaces resistant to such heat, Dobbie uses Chateaugay, Republic's exclusive premium Pig Iron, in its cupola mixture.

Resistance to heat and corrosion are only two of many benefits foundrymen enjoy with Chateaugay. It also produces an unusually fine and uniform grain structure with high wear resistance. Chateaugay castings machine beautifully and economically. Chateaugay shrinks evenly, fills adjoining light and heavy sections completely.

For the complete story on Chateaugay, the low-phosphorous, copper-free Pig Iron, call in a Republic Pig Iron Metallurgist. He has all the facts. He can show you how to obtain high strength, uniformity and machinability throughout every casting.

Just let us know when you would like him to call.

REPUBLIC STEEL CORPORATION

GENERAL OFFICES • CLEVELAND 1, OHIO

Export Department: Chrysler Building, New York 17, New York

REPUBLIC PIG IRON

"CHATEAUGAY"	REPUBLIC	REPUBLIC
Low-Phosphorous, Copper-Free	(Northern) Foundry, Bessemer Basic and Malleable	(Southern) Foundry and Basic

REPUBLIC STEEL

CHARLES E. BRUST
President

CARL L. LIEBAU
Vice President

JOHN A. WAGNER
Charles H. McCrea Award Winner

MALLEABLE FOUNDERS

Study Sales and Production Methods

By FRANK G. STEINEBACH
Editor

PROGRAM of the annual meeting of the Malleable Founders' Society, held June 14-15 at the Seigniory Club, Montebello, Que., was concerned chiefly with means of increasing sales efficiency and improving production methods.

In opening the meeting, George T. Boli, Northern Malleable Iron Co., St. Paul, and president of the society, reported the year's chief activities were pointed toward sales promotion, These include the inauguration of regional sales clinics, the start of a society-sponsored business paper advertising campaign, the organization of a Handbook Revision Committee, the continuance of the annual Market Development Conferences, and the appointment of committees to study the welding of malleable iron and specifications for pearlitic malleable iron.

The highest award of the society, presented annually in memory of Charles H. McCrea, former president of the National Malleable & Steel Castings Co., was presented to John A. Wagner, president, Wagner Malleable Iron Co., Decatur, Ill., for outstanding service to the malleable iron castings industry. In making the award, Cal C. Chambers, president, Texas Foundries Inc., Lufkin, Tex., reviewed the many contributions of Mr. Wagner to the industry.

Mr. Wagner is a past president of the society; served on its board of directors for 10 years; for many years he was a member of the Cost Accounting Committee, and its chairman from 1937 to 1953; was a member of the Malleable Industry Advisory Committee to the WPB and OPA during World War II and a member of the Industry Advisory Committee to the OPS from 1951 to 1953. He was cited especially for his outstanding contribution to the development of a "Manual of Principles and Procedures of Cost Accounting" for the industry and for his interest in the production and promotion of pearlitic malleable castings.

Charles E. Brust, president, Eastern Malleable Iron Co., Naugatuck, Conn., was elected president of the society, and Carl L. Liebau, executive vice president and general manager, Federal Malleable Co., West Allis, Wis., was named vice president. New members of the board of directors are: Phillip C. DeBruyne, vice president, Moline Malleable Iron Co., St. Charles, Ill., Charles P. Speitel, president, Pennsylvania Malleable Iron Corp., Lancaster, Pa.; and Leon J. Wise, vice president, Chicago Malleable Castings Co., Chicago.

The merchandising of malleable was developed further in a round-table discussion on "Increasing Sales Efficiency," with George T. Boli, presiding and R. L. Gilmore, president and general manager, Superior Steel & Malleable Castings Co., Benton Harbor, Mich., and Frank O. Parker, vice president and sales manager, Dayton Malleable Iron Co., Dayton, O., participating.

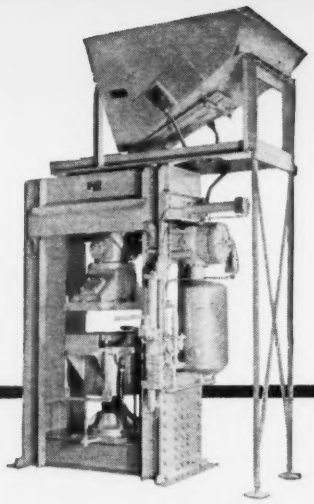
Mr. Boli stressed the importance of constructive selling methods which help the customers understand the savings which can be provided by substituting malleable iron castings for components made by other methods of fabrication. A program of training young engineers for sales work, which his organization started five years ago, was discussed. The engineer first is put in the plant so that he may become familiar with production problems. Next he spends five months learning sales department routine, and then is taken on calls with older contact men. Mr. Boli stated it took nine months to provide any tangible results, but two years later a second engineer was added, and a year ago another was started in the same course.

Salesmen are taught to stress the possibility of reducing parts by combining them into one malleable casting. Creating new business is the prime interest of the salesmen. Furthermore, it is important that the

(*Continued on page* 154)

FOUNDRIES LOOK TO DEMMLER FOR CORE BLOWERS!

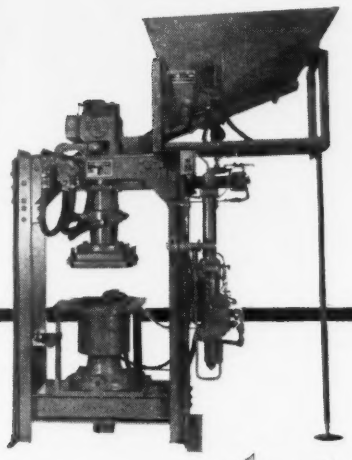
4 reasons why



DEMMLER *Model* 100 Series CORE BLOWERS-Available in four sizes

1

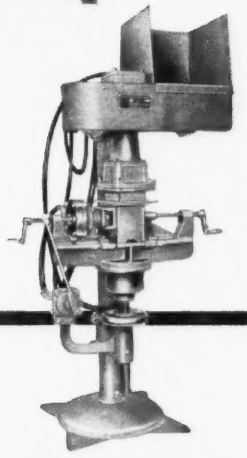
A number one reason for Demmler leadership. The Demmler 100 Series was designed for fast operation on defense project where it was necessary to blow 2,000 cores per hour! Now it is available for faster core blowing in your foundry. Stationery magazine type core blowers capable of blowing ANY core or molding sand.



DEMMLER *Model* 1E-OS CORE BLOWER

2

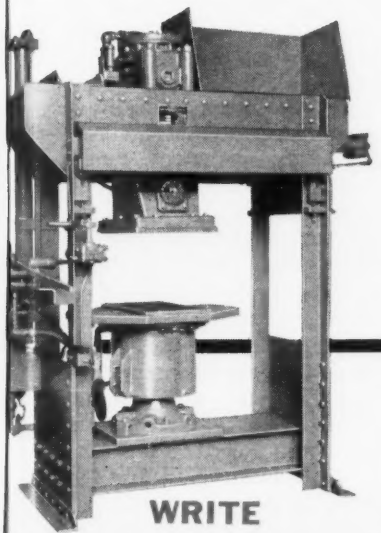
This core blower is another production pace setter. It can be used with two drag halves so the operator can remove one core while the second core is being blown. Double production because there is no waiting! One push of the starting lever and the machine automatically completes one cycle and the magazine returns to filling position. Write for information about this production-worthy Demmler 1E-OS.



DEMMLER *Model* 55 CORE BLOWER

3

This little giant is unequalled among competitive core blowers for fast, economical production on short run jobs. The Demmler 55 has one hand valve that operates both vertical and horizontal core box clamps and blows the core—in only 3 seconds! Used for core boxes with depths up to 10", handles cores up to 4 lbs. A wide range of sand magazine bottom openings available to meet all your core box dimensional requirements.



DEMMLER *Model* 2E CORE BLOWER

4

Built for rugged service without maintenance troubles. The Demmler 2E handles cores up to 20 pounds. Available with manual, semi-automatic or fully automatic controls. The draw cylinder is 11" in diameter and the machine has a 10" stroke. The drawing post is completely enclosed and protected from sand and abrasion to guarantee accuracy and trouble-free operation. Ultra high speed blow valve action increases initial blow pressure 25%.

All models of Demmler Core Blowers can be furnished with vibratory sand feeders as shown above on the 100 series and the 1E-OS.

WRITE FOR LITERATURE • WM. DEMMLER & BROS. • Kewanee, Illinois

(*Continued from page* 152)

salesman get all possible information on the job, and learn what can be done to provide better properties and casting practice through design changes. The sales engineers do the redesigning when necessary and make the estimate on the job. Last year the company converted 67 jobs to malleable; so far this year 50 jobs have been converted and quotations are out on 100 more. Mr. Boli believes that such a sales force promotes the customer's confidence and respect.

Mr. Gilmore stressed the importance of proper design to the job of creative selling. He pointed out that there is no other method than casting which makes it possible to place metal accurately where it will do the most good. His company maintains a stress laboratory which is providing valuable information in the sale of castings.

Holds Sales Clinic

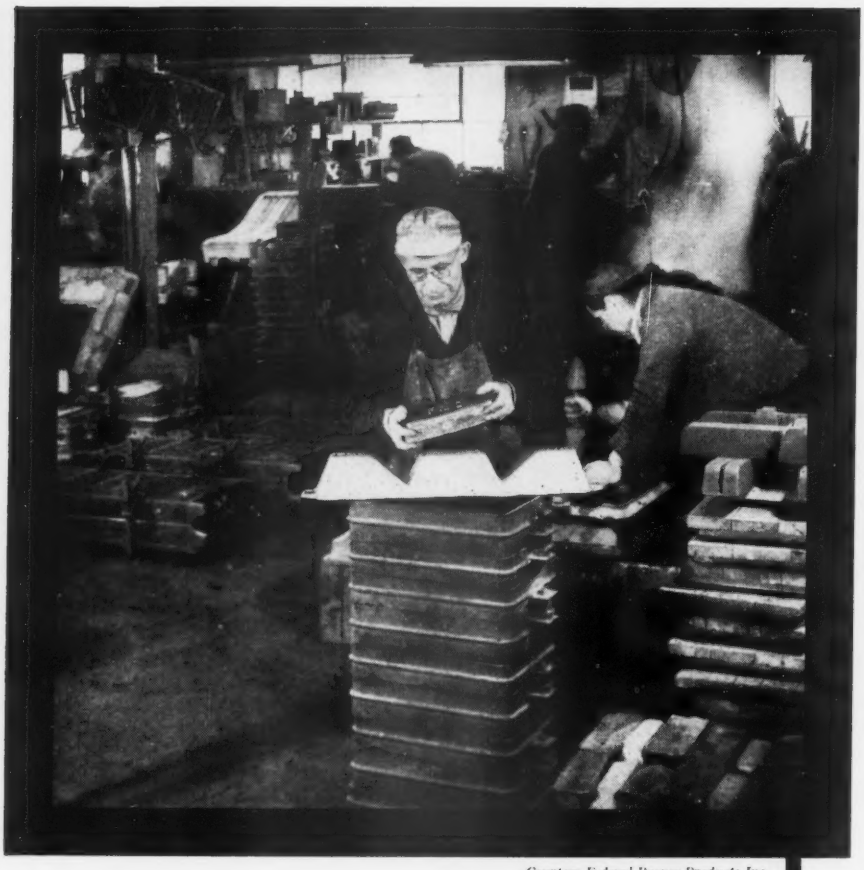
The Superior company conducts a sales clinic for all supervisors and sales personnel. A limited number of engineers from customer companies are invited to spend two days receiving information on castings and foundry problems. The response has been excellent and all but one of those attending last year have asked to come back for the 1954 conference.

Mr. Parker stressed the problems of the sales manager of a larger foundry, one with a sales force which has done little real selling during the last few years, and which, to a certain extent, has forgotten how to sell. Furthermore, companies making competing products, have increased their sales forces, thus increasing the pressure for business. But the problems today are no different than they were in the twenties when the need for intelligent selling was great

Reports of various committees, presented at the first session, indicated a year of progress. Carl L. Liebau stated the Educational Committee was concerned with featuring promotion of the booklet, "The Malleable Iron Foundry and You." In addition to distribution among pupils at secondary schools, the committee recommends consideration of giving a copy to employees, since it may reach interested boys through that channel. The committee will co-operate with AFS in the youth development program now being initiated. Importance of getting information on the opportunities offered by the industry into the hands of students at all levels was emphasized by the committee.

Mr. Liebau also reported that the Advertising Committee has selected

(*Continued on page* 156)



Courtesy Federal Bronze Products Inc.

What's the miracle additive in brass and aluminum ingot?

Let's face it! There is nothing in the ingot but good metal, precisely alloyed to specifications. But when you buy your ingot from Federated . . . there is *an* extra. It's *good technical service.*

This service means that you can have practical help in your foundry from a Federated field expert . . . help which saves you headaches and dollars.

See Federated first for *any* non-ferrous foundry metal! Aluminum, brass and bronze alloys, magnesium alloys, deoxidizers and hardeners.

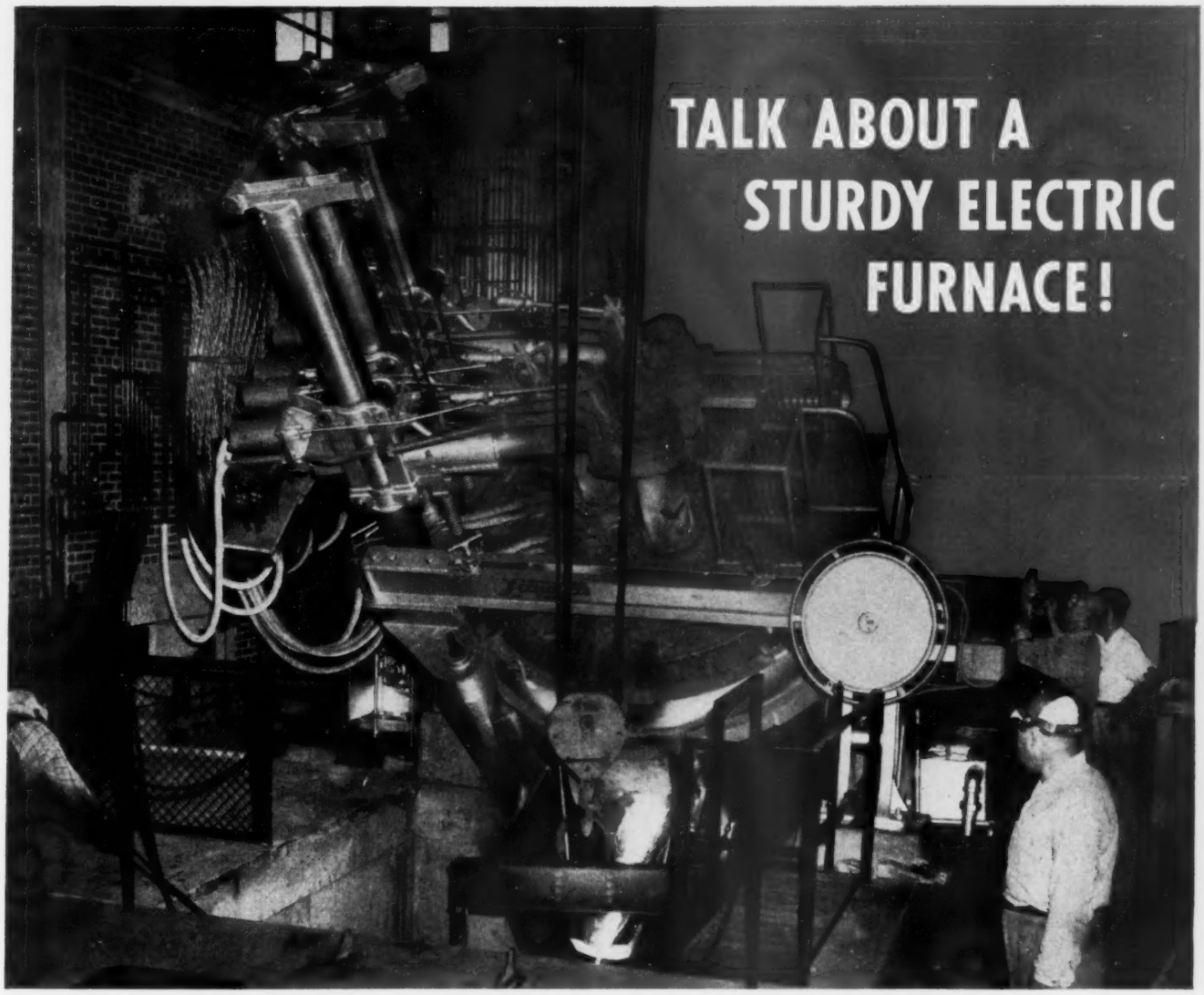
For your convenience Federated has 24 sales offices and 14 plants across the nation.

Federated Metals Division

AMERICAN SMELTING AND REFINING COMPANY
120 BROADWAY, NEW YORK 5, N. Y.
In Canada: Federated Metals Canada, Ltd., Toronto and Montreal

Federated first in the non-ferrous field FMD

Aluminum, Magnesium, Babbitts, Brass, Bronze, Anodes, Zinc Dust, Die Casting Metals, Lead and Lead Products, Solders, Type Metals



"Our old Lectromelt takes the power overload of an oversize transformer without a sign of strain to the furnace or its parts."— Duncan Foundry, Alton, Illinois

Look at the record of Duncan Foundry's durable Lectromelt*

In October 1952, this test was made on their 1½-ton per hour Lectromelt: The furnace operated steadily for 27 days, 24 hours per day, using an oversize, 2000-kva transformer. 578 heats were tapped for an average of 21.4 heats per day. Average charge per heat was 6688 lbs. Time from power-on to tap averaged 58.5 minutes per heat. Time from tap to power-on for next heat averaged 8.8 minutes. Average power consumption per ton of metal was 501 kwh.

Duncan's oversize transformer keeps metal pouring fast, but throws a jolting overload of power into the furnace to do it. Still operating under this maximum stress, their sturdy Lectromelt turns out daily heats without a sign of extra strain or wear.

Expanding recently, Duncan Foundry added another, larger Lectromelt Furnace, confident of its quality and durability.

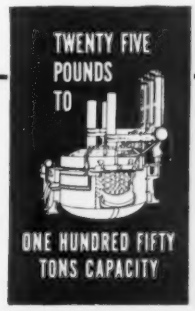
Look for your new electric in Lectromelt's Furnace line. Write for Bulletin No. 9, describing these versatile melting, smelting, refining and reduction furnaces. Write Pittsburgh Lectromelt Furnace Corporation, 314 32nd Street, Pittsburgh 30, Pennsylvania.

Manufactured in... GERMANY: Friedrich Kocks GMBH, Dusseldorf... ENGLAND: Birlec, Ltd., Birmingham ... FRANCE: Stein et Roubaix, Paris... BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege ... SPAIN: General Electrica Espanola, Bilbao ... ITALY: Forni Stein, Genoa. JAPAN: Daido Steel Co., Ltd., Nagoya

*REG. T. M. U. S. PAT. OFF.

MOORE RAPID

WHEN YOU MELT... *Lectromelt*



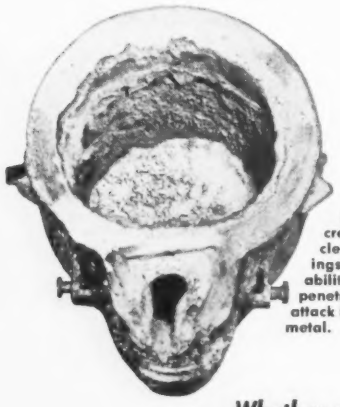
Line ladles for longer life

...Easily, Quickly

with J-M 3X Blazecrete®
the hydraulic-setting refractory

Easy to apply—3X Blazecrete—the 3000F refractory—is easily and quickly applied . . . mix with water like ordinary concrete, and slap-trowel to desired thickness. Air-cures without application of heat. Contains no harmful irritants . . . safe even for hand application. 3X Blazecrete is furnished as a dry mix, and may be stored indefinitely without deterioration.

Longer-lasting linings can be built with 3X Blazecrete because it is spall-resistant, withstands slagging action and has negligible shrinkage.



3X Blazecrete means cleaner forgings, has great ability to resist penetration and attack by molten metal.

Send for free brochure on Blazecrete (RC-28A) describing its properties and uses. To obtain a copy—as well as additional application details—write Johns-Manville, Box 60, New York 16, N. Y. In Canada, 199 Bay Street, Toronto 1, Ontario.

Whether you gun it... *or slap-trowel it...*

JOHNS-MANVILLE JM PRODUCTS **Johns-Manville BLAZECRETE**

BUILDS BETTER REFRACTORY LININGS

(*Continued from page* 154)

an advertising agency and launched a promotion program for malleable iron castings in five business publications. The program will be continued during the coming fiscal year. While the program is modest, the committee believes it is an important step in making casting buyers more conscious of the availability of malleable castings as engineering materials with excellent physical properties for a wide variety of applications.

The Cost Committee reported the completion of cost research project No. 1 to illustrate the various factors in cost finding. Results of the survey have been presented at sectional meetings and to the entire membership of the society.

The society is in good financial condition and is operating within the budget, according to Wilson H. Moriarty, vice president, National Malleable & Steel Casting Co., Cleveland, and chairman of the Finance Committee. The committee recommended that funds for market development should be built up to handle the cost of publishing the revised handbook within the next two years.

Handbook Moving Forward

The Government Affairs Committee continues to maintain contact with Washington agencies affecting the industry, according to C. M. Lewis, president, Badger Malleable & Mfg. Co., South Milwaukee. During the year, a protest was made on unrestricted exportation of scrap. The problem of finding industry personnel for the Business and Defense Service Administration was given considerable attention.

Paul H. Vincent, vice president and general manager, Erie Malleable Iron Co., Erie, Pa., reported that work on the handbook is moving forward. An editor has been engaged and chapter assignments have been made.

Through the work of the Market Development Committee, more people are getting to know more about malleable iron, according to Thomas A. Scanlan Jr., director of sales, Eastern Malleable Iron Co., Newburgh, N. Y., and chairman of that committee. During the year, the committee staged four sales clinics, held the fifth Market Development Conference, (FOUNDRY for June, page 173), suggested methods for handling the applications section of the handbook, solicited complete new lists of customers to receive "Malleable Iron Facts" which is published by the society, made a survey of business gained and lost through conversions, and recommended study of ASTM specifications for pearlitic malleable iron. The com-

mittee also recommended that each member company endeavor to make greater use of the society's promotion movie, "This Moving World."

Cal C. Chambers stated the Personnel and Plant Operations Committee had undertaken a modest program in the field of safety. Winners in a safety letter contest were presented in FOUNDRY for February, page 106. Cash awards were made to winners of the annual safety contest. Through co-operation of the individual plants, the frequency rate of the industry has been reduced by 30 per cent since 1951.

The committee staged a personnel conference during the year with an outstanding program. The committee will continue to keep member companies aware of developments in the field of good personnel relations.

The Research and Product Improvement Committee, according to Ralph T. Rycroft, Kencroft Malleable Co., Buffalo, has been engaged in a research project on gating and feeding of malleable iron castings. The committee has sponsored 14 shop practice meetings, provided co-operative action with other societies interested in malleable castings, kept in contact with government arsenals and research laboratories, and undertaken specification changes.

Study Gating and Feeding

William A. Kennedy, supervisor of products, Columbia Malleable Iron Co., Columbia, Pa., and chairman of the Technical Council, stressed the importance of Research Project No. 2, which has been in progress for the third consecutive year and stated that the council has contributed considerably to the work. Recently a special conference was devoted to consideration of specifications for pearlitic malleable iron.

James H. Lansing, technical and research director, outlined the results presented in Part III of the study on gating and feeding of malleable iron, which concerns further studies of castings fed by a single side blind riser. This 84-page report, published in June, provides a large amount of practical data on such subjects as a cored casting fed by a single side blind feeder; distance of feeding in solid cylinders and strips of uniform thickness cast horizontally and side fed by a single blind feeder at one end; gate size and shape, effect of pouring rate, and, multiple castings with a single feeder. The project was carried on at Cornell University, Ithaca, N. Y. During the coming year, this report will be discussed at shop practice meetings.

In opening the second session, Pres-

(*Continued on page* 159)

A BOND CLAY
for every foundry!
No one clay can bond every possible molding sand for every type foundry . . .
BUT . . .
One of the many
OR
One combination
of the many clays produced by Eastern Clay Products will fit your specific needs.
Regardless of price, you can't buy better Western Bentonite, Southern Bentonite, Fire Clay or Special High Flowability Bonding Clays than those sold by us.
We invite your inquiries.
Hickman, Williams & Co.
(INCORPORATED)
CHICAGO · DETROIT · CINCINNATI · ST. LOUIS · NEW YORK
CLEVELAND · PHILADELPHIA · PITTSBURGH · INDIANAPOLIS
Established 1890

Most for your electrode dollar...

NATIONAL CARBON COMPANY'S Carbon and Graphite Electric Furnace Electrodes

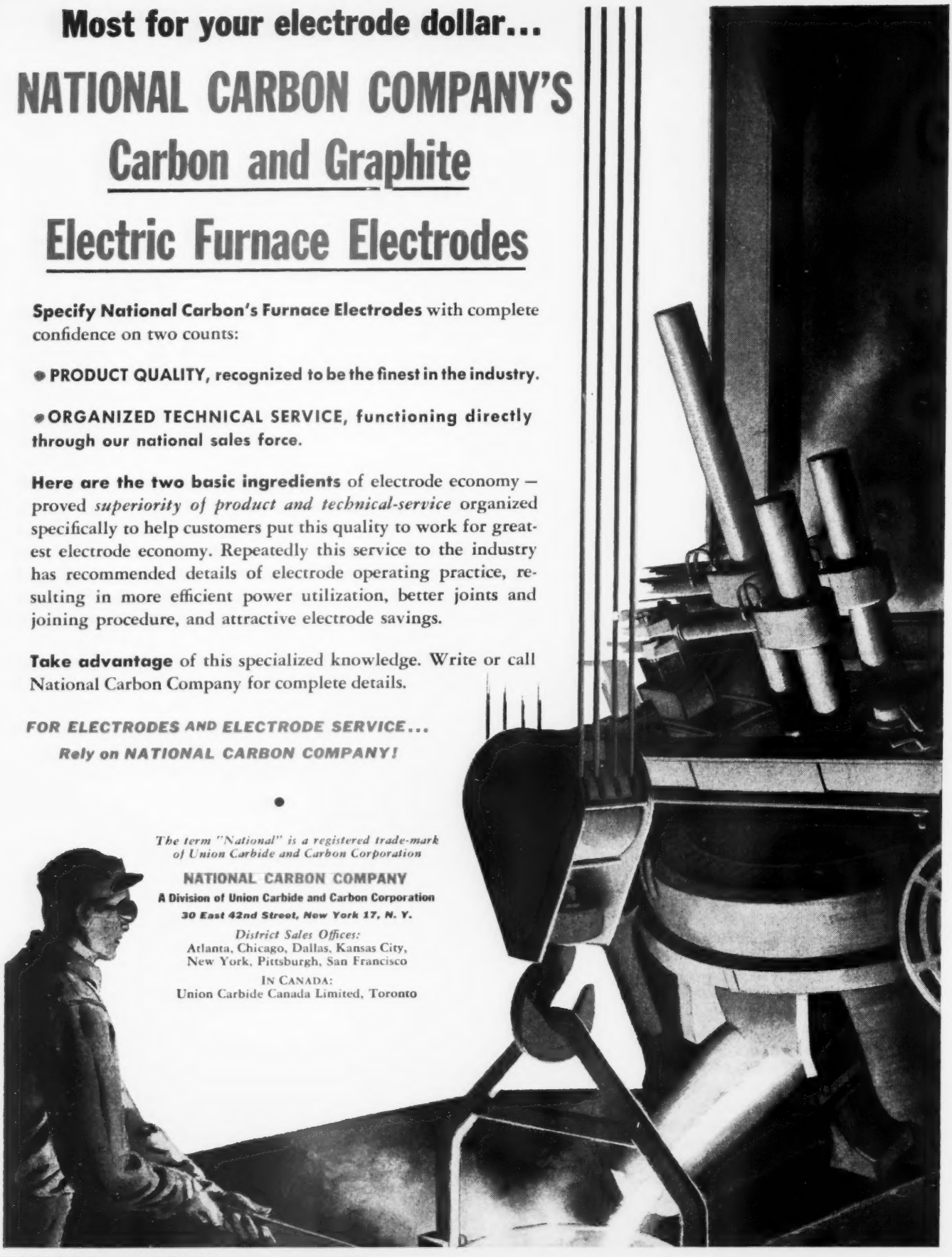
Specify National Carbon's Furnace Electrodes with complete confidence on two counts:

- **PRODUCT QUALITY, recognized to be the finest in the industry.**
- **ORGANIZED TECHNICAL SERVICE, functioning directly through our national sales force.**

Here are the two basic ingredients of electrode economy — proved *superiority of product and technical-service* organized specifically to help customers put this quality to work for greatest electrode economy. Repeatedly this service to the industry has recommended details of electrode operating practice, resulting in more efficient power utilization, better joints and joining procedure, and attractive electrode savings.

Take advantage of this specialized knowledge. Write or call National Carbon Company for complete details.

FOR ELECTRODES AND ELECTRODE SERVICE...
Rely on NATIONAL CARBON COMPANY!



The term "National" is a registered trade-mark of Union Carbide and Carbon Corporation

NATIONAL CARBON COMPANY
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street, New York 17, N. Y.

District Sales Offices:
Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco

IN CANADA:
Union Carbide Canada Limited, Toronto

NATIONAL CARBON PRODUCTS

BLAST FURNACE LININGS • BRICK • CINDER NOTCH LINERS • CINDER NOTCH PLUGS • SKIMMER BLOCKS • SPLASH PLATES • RUNOUT TROUGH LINERS • MOLD PLUGS • TANK HEATERS

(*Continued from page* 157)

ident Brust pledged continuation of things helpful to the industry during the coming year. The gating and feeding project will be carried on in plants of members. The Technical Council will undertake a study to determine how malleable castings can be produced free from primary graphite in the heavier sections. Increasing the use of malleable iron and pearlitic malleable will be pushed.

Effort will be made to increase interest in the cost accounting meetings. Three divisions—west, middle and east—have been established, replacing the previous seven. The society also plans one or more general cost accounting meetings during the year. Sales engineering clinics will be organized, and a sixth Market Development Conference will be staged this year. Revision of the handbook will be pushed. The society will hold an industry meeting at the Albion Malleable Iron Co., Sept. 24. The 1955 annual meeting will be held at the Greenbrier, White Sulphur Springs, W. Va., June 16-18.

Profit Lower Than Averages

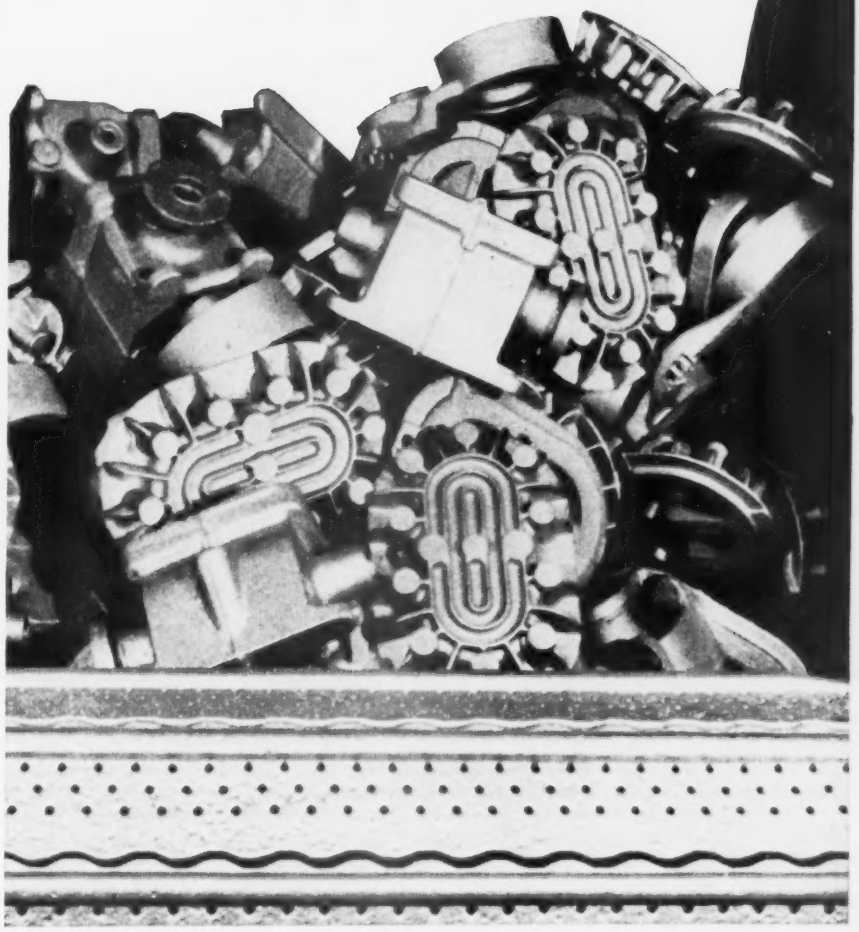
Lowell D. Ryan, managing director of the society, expressed concern over the profit situation of the industry. A recent survey showed an average of 5.3 per cent profit on sales for all industry, with malleable somewhat lower than average. Mr. Ryan emphasized that the industry has an obligation to make fair earnings on a regular basis in order to secure funds to maintain and expand its plant to meet peak demands. The cost of this must be shared by customers of castings producers.

The managing director believes that malleable foundries should develop adequate executive personnel within the industry. He mentioned the possibility of developing an executive training program operating on an industry basis within the individual plants. The society, he pointed out, has an exceptional record of accomplishment, due to aggressive, dynamic leadership.

A roundtable discussion featured cost reduction activities of particular interest to the society membership. Collins L. Carter, president, and Thomas L. Lloyd, vice president, Albion Malleable Iron Co., introduced a promotional motion picture just completed by that company. The movie emphasizes facilities for production since the company has found a lack of appreciation on the part of buyers of what is required to make a casting. The movie, which cost under $10,000, will be shown to engineers, buyers and students.

(*Concluded on page* 162)

These castings were cleaned by "CERTIFIED" ABRASIVES!



"Certified" does a better job in less time at lower cost.

Why? Because "Certified" Samson Shot and Angular Grit is made *extra-tough. Extra-tough* to clean more thoroughly, more quickly. *Extra-tough* to last . . . to be reused again and again without breaking down.

It all adds up to lower time, labor, and abrasive costs for you. See for yourself! Switch to the abrasive made by the oldest abrasive manufacturing company in the world . . . switch to "Certified" Abrasives!

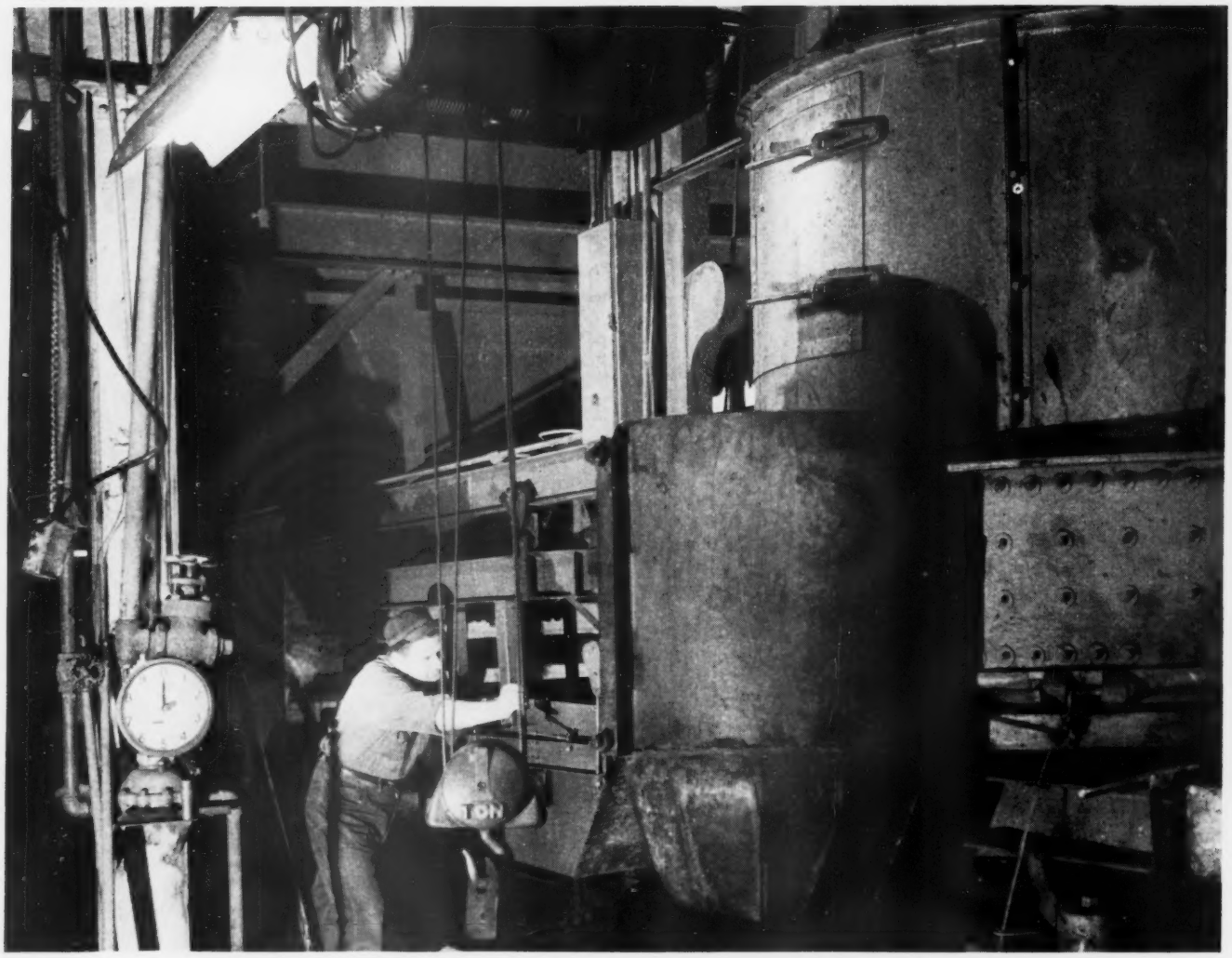
THE STANDARD OF EXCELLENCE FOR OVER 60 YEARS

PITTSBURGH CRUSHED STEEL CO., Pittsburgh, Pa.

STEEL SHOT AND GRIT CO., Boston, Mass.

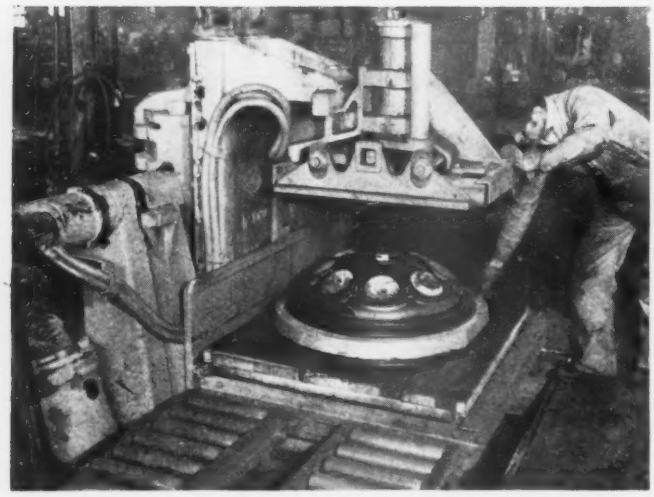
MEMBER FEMA

(Advertisement)

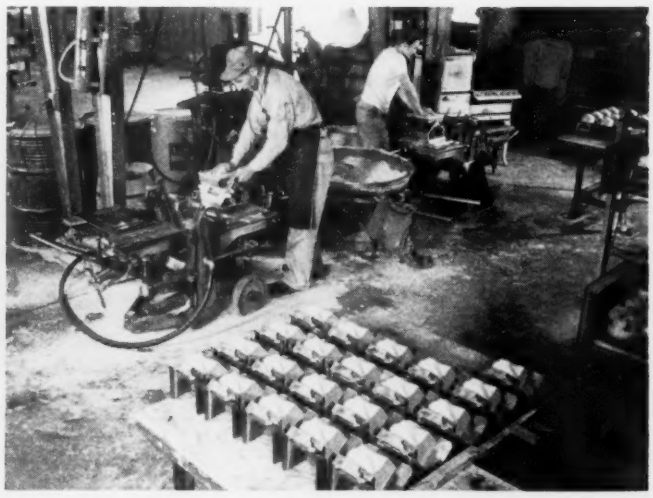


These Foundries Report Profits!

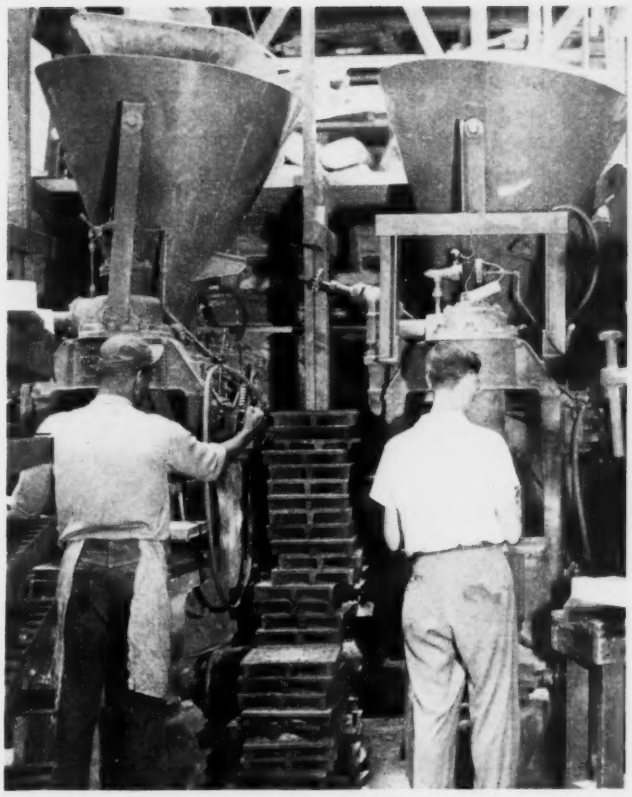
SPEEDMULLORS ON BOTH MOLDING LINES at the I. F. Sales Company foundry at New Philadelphis, Ohio, thoroughly mull all of the all-purpose sand required for 250,000 malleable castings per month. The sand is reused many times a day and enters the "70" Speedmullor (shown above) and the "50" on the other line, very hot. Speedmullor Cooling cools the sand *during* mulling. *For full information write Beardsley & Piper, 2424 N. Cicero Avenue, Chicago 39, Illinois.*



SPECIALLY DESIGNED FOR SLINGER INSTALLATIONS, this J & J Rol-A-Draw rolls over and precisely draws the molds rammed on a slinger-roller conveyor molding unit at Casting Service Corporation, LaPorte, Indiana. The Rol-A-Draw greatly simplifies the job of mold and pattern handling. *For full data write to Beardsley & Piper, 2424 N. Cicero Ave., Chicago 39, Illinois.*



ON THIS DIFFICULT COREMAKING JOB, CHAMPION JOLT ROLLOVERS are doing a fast precision job. The very deep-finned insert cores for aluminum cylinder heads are produced in large quantities. To fill and draw the deep thin fin sections requires perfect Champion jolting action and a precision Champion draw. *Obtain full data by writing Beardsley & Piper, 2424 N. Cicero Avenue, Chicago 39, Illinois.*

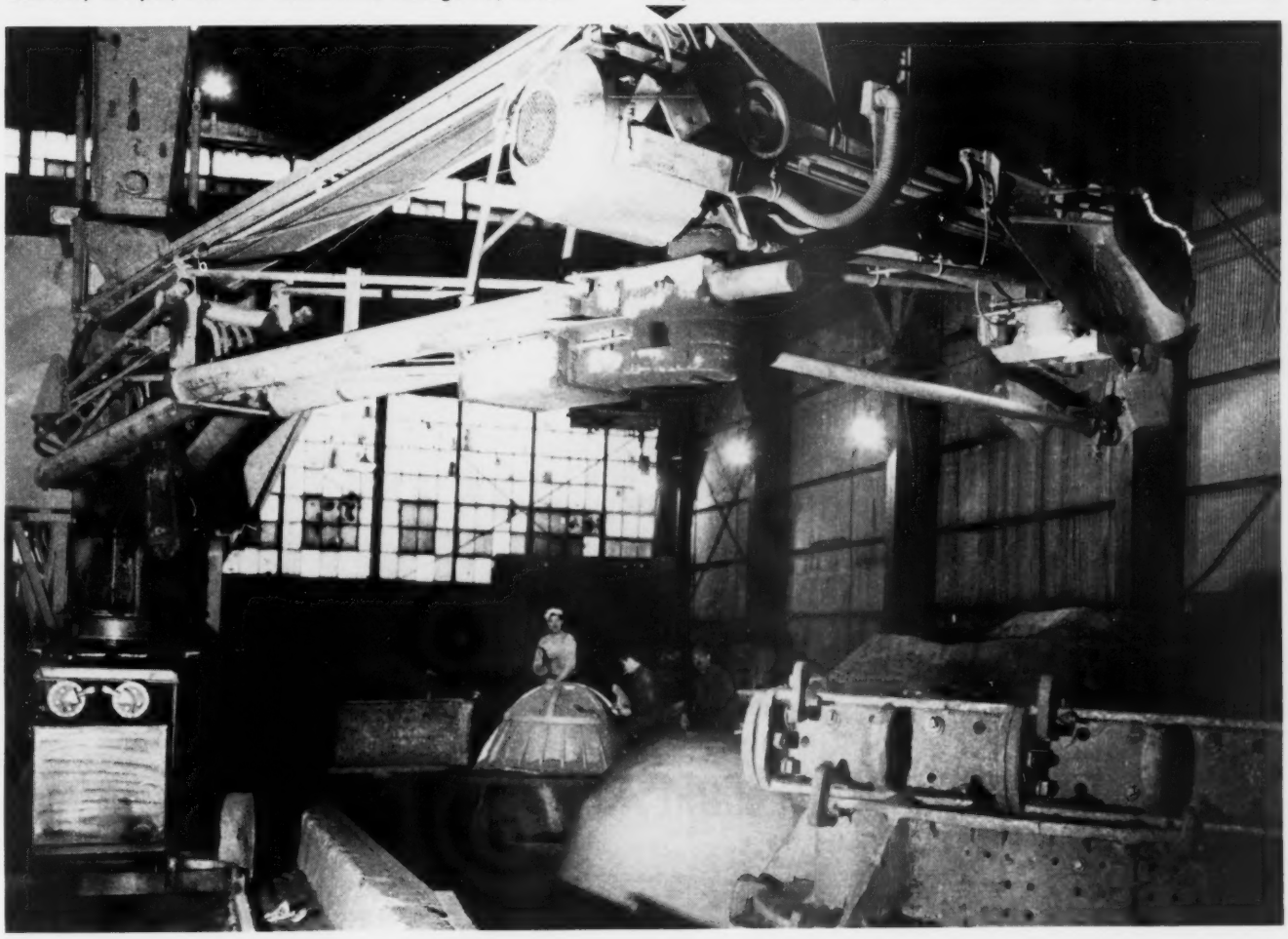


CHAMPION FLEXIBLOS IN THIS MAGNESIUM FOUNDRY mean real savings on small and medium size cores. In producing precision magnesium aircraft castings, the Howard Foundry in Chicago depends on Champion Flexiblo Core Blowers and Speedmullors. *For more data on this interesting operation write now to Beardsley & Piper, 2424 N. Cicero Ave., Chicago 39, Illinois.*

SCREENARATORS AND J&J JOLT SQUEEZERS handle much of the side floor molding at Harsch Bronze in Cleveland. *For more information write to Beardsley & Piper, 2424 N. Cicero Avenue, Chicago 39, Illinois.*

A JR. NITE GANG CUTS COSTS in side floor molding sand preparation at the Kasper Foundry, Elyria, Ohio. *For full information write to Beardsley & Piper, 2424 N. Cicero Avenue, Chicago 39, Illinois.*

PITTSBURGH STEEL'S FOUR SPEEDSLINGERS AND A SANDSLINGER ram a major portion of that foundry's molds. Jobbing work ranging from several pounds to well over 200,000 pounds is produced. Slingers are indispensible in this operation. *For the full story write today to Beardsley & Piper, 2424 N. Cicero Ave., Chicago 39, Illinois.*



(*Concluded from page* 159)

Dudley V. Walker, managing director, Eberhard Mfg. Co. Division, Eastern Malleable Iron Co., Cleveland, outlined some of the recent activities of Eastern. A cost reduction program is operated by a committee composed of two representatives from each plant. They meet monthly at one of the plants and consider a wide range of operations, including accounting, purchasing, production. The dollar per year saving on each committee project is determined.

James H. Smith, general manager, Central Foundry Division, General Motors Corp., Saginaw, Mich., reported that through additions of boron, it has been possible to shorten the anneal cycle by 25 per cent. As a result, some of the company's annealing equipment has been eliminated. Mr. Smith believes that the greatest field for cost reduction is in better methods and work simplification. In his opinion, the industry does not spend enough in that field.

Carl L. Liebau pointed out that during the recent periods of heavy demand, there were lots of excuses for high scrap losses. This was a bad habit to acquire, and it is most difficult to correct. His company has been engaged in this project and has had to do it without heavy expenditures for equipment. H. Winton Streeter, general manager, Foundry Division, Lehigh Foundries Inc., Easton, Pa., discussed shell molding and the use of shell cores which has resulted in considerable savings in the amount of sand handled.

The session was concluded with an address by Lee C. Shaw, Seyforth, Shaw & Fairweather, Chicago, entitled "Should the Malleable Industry Play Follow the Leader in Labor Negotiations?" It was his opinion that the industry should not.

Want core plates that SAVE MONEY?

. . . then use TRANSITE CORE PLATES for easy handling, low maintenance, long life!

You get real long term economy with Transite* Core Plates. Their initial cost is low . . . and their maintenance cost negligible. Transite Core Plates are tough and corrosion-resistant. They are made from an asbestos and cement composition by a special Johns-Manville process. They resist shock and corrosion . . . will not crack or break easily.

Here are other important reasons for using Transite Core Plates:

THEY SPEED PRODUCTION— Transite Core Plates are easily handled. They're simple to clean, too, since core wash, sand, etc. do not adhere to them as readily as to other core plate materials.

THEY MAINTAIN ACCURACY— Foundrymen who have used Transite Core Plates for years report minimum warpage.

For cores of large mass and small surface area, perforated Transite Core Plates are also available to eliminate green cores and reduce baking time. For full details, write Johns-Manville, Box 60, New York 16, New York.

*Reg. U. S. Pat. Off.

Johns-Manville TRANSITE CORE PLATES

Made of Asbestos

OBITUARY

RAWSON VAILE, 67, executive vice president and director, American Blower Corp., Dearborn, Mich. and director, Canadian Sirocco Co. Ltd., Windsor, Ont. died June 19. Graduated from Purdue University in 1909, he had been with American Blower since 1912.

* * *

Nathaniel R. Richardson, 56, vice president-works manager, Electric Controller & Mfg. Co., Cleveland, died June 14. Mr. Richardson, a graduate of Yale University, joined the company in 1924.

* * *

Daniel M. Randall, 70, former vice president of Somerville Iron Works, with headquarters in Chicago, died June 18. He retired in 1950.

* * *

Roy A. Lattimore, 63, owner and operator of Bakersfield Foundry, Bakersfield, Calif., died June 23.

Small Industry Foreman Subject of Booklet

The Small Business Administration has issued a new booklet, "The Foreman in Small Industry." Subjects range from an appraisal of the job of the foreman, through his responsibilities and training functions, to his personal relationships and individual development. Suggestions offered in the booklet are built up in terms of things which can be done. Specific examples designed to be meaningful to all small plant operators are used.

The booklet is No. 14 in SBA's management series and was written by Philip E. Henderson, chairman, Department of Economics and Business Administration, Wilmington College, O. It can be obtained for 20 cents from the Superintendent of Documents, Washington 25.

Meters by the millions ...

from metal melted by

6 DETROIT ROCKING ELECTRIC FURNACES

Recently, the 11,500,000th Neptune meter was produced. This, like the bronze-cased Neptune meters for 30 years, was made from metals melted in a Detroit Rocking Electric Furnace.

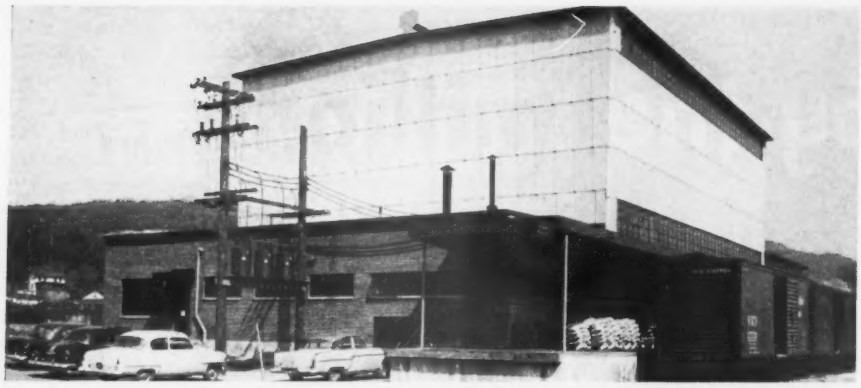
The six DEF Furnaces in Neptune Meter Company's foundry are under constant pressure to meet production demands which call for hundreds of tons of melt per month. To meet quality standards, melts must be uniform, of exact analysis, and produced with economy and speed.

The indirect arc and controlled rocking action of Detroit Furnaces bring important advantages to production of both non-ferrous and ferrous melts. To learn how these advantages can benefit *your* foundry operations, let our engineers analyze your melting requirements. Write today!

DETROIT ELECTRIC FURNACE DIVISION

KUHLMAN ELECTRIC COMPANY • BAY CITY, MICH.

Foreign Representatives: in BRAZIL—Equipamentos Industrias, "Eisa" Ltd., Sao Paulo; CHILE, ARGENTINA, PERU and VENEZUELA: M. Castellvi Inc., 150 Broadway, New York 7, N.Y.; MEXICO: Cia Proveedora de Industrias, Atenas 32-13, Apartado 27A3, Mexico 6, D. F., Mexico; EUROPE, ENGLAND: Birlec, Ltd., Birmingham.



New Penn-Rillton plant for manufacture of foundry facings and core binders

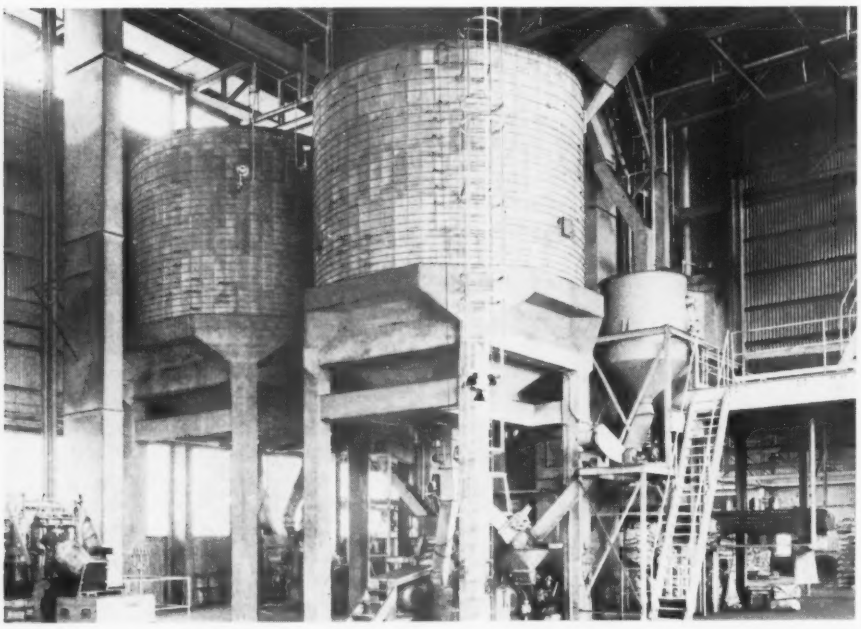
New Processing Plant Has
EFFICIENT DUST CONTROL

A NEW plant of the Penn-Rillton Co. at West Elizabeth, Pa., for the processing of lump coal and coal tar pitch into foundry mold facing and core binder materials, sets new standards in dust control and dust collection. The plant houses one of the most concentrated and completely automatic installations of materials handling and processing equipment ever packed into an area of comparable size.

Foolproof interlocking automatic controls, explosion-proof motors and electrical equipment, and an all-inclusive dust control and collection system have been provided by the Austin Co., which designed the plant and processing installation in the interests of efficiency, economy and safety, as well as working conditions.

Because of the nature of the raw materials and products processed in the plant, a highly efficient dust collecting system is required. The entire conveying and processing installation is completely enclosed and dust-tight. A negative pressure is maintained in the system by the dust collecting equipment, with one collector for pitch dust and one for seacoal dust. The collectors may be operated in combination or independently.

Lump coal and dry coal tar pitch are received by rail, conveyed by belt to a single roll crusher, then elevated to the top of the building. Passing through screw conveyors, the coal and pitch are delivered to their respective storage silos of 100-ton capacity. Additional processing equipment reduces the materials to 200 mesh or finer before they arrive at bagging machines on the main floor. Present manufacturing area measures 74 x 100 ft; this leaves considerable room for future expansion.



Manufacturing area is 74 x 100 ft, leaves considerable room for expansion

Southern Foundry

(*Continued from page* 93)

taken the progressive attitude that a foundry should sell a cast engineered part, not merely a casting. To this end it devotes considerable attention to design service to customers — existent and potential — with a full-time engineer engaged solely in product development work. As a result, it has been successful in translating into casting business a number of parts previously made by other methods of fabrication.

The company operates a fairly complete machine shop, which permits delivery of semifinished, if not completely finished, castings for certain applications. This frequently has proved an additional valuable service to customers. A shop for pattern repairs also is operated.

Ross-Meehan has seen the need for continuous training of its personnel for maximum performance. A management development program, consisting of ten weekly two-hour conference type meetings, has been given to the entire supervisory group, including foundry, office, sales, purchasing and standards departments. The company is thought to be the first foundry in the South to have this type of program, which is conducted by the University of Tennessee, Division of Extension, with Prof. David M. Faulkner conducting the courses. The main topics center about various phases of dealing with people in the shop.

Program Fits Needs

This training program is unique in that it is tailor-made to the company's needs rather than being a "canned" program. Through these conferences it is felt that the foremen will not only be better supervisors in their departments, but that they will develop a greater appreciation of the problems met by, and need of co-operation with, other foremen and staff people. The intended end result is team building.

In addition to supervisory training, the company is conducting apprentice, molding techniques and safety training programs. Tangible evidence of its success in safety work is the fact that for the last four years the company has been an award winner in the safety contest conducted annually by the Steel Founders' Society of America. Workers who do incur injuries are assured of expert care in the company's new and immaculate first-aid department where a registered nurse is on continuous duty. This unit is

(*Concluded on page* 166)

BUY PERFORMANCE

... it's WORTH the Price!

THE TRUE VALUE OF A GRINDING WHEEL is measured by the quality and quantity of the *grinding* it does . . . not by its price.

This real value can be determined only by finding the cost per pound of stock removed and checking the accuracy and finish of the surface left on the work.

Judge BAY STATE "WHEELS OF PROGRESS" on this basis. You'll find that their *exact* specification and consistent cool-cutting characteristics produce longer, more useful life . . . that keeps *real* grinding costs at a minimum.

BAY STATE'S Factory or Distributor Representatives will be glad to show you how "WHEELS OF PROGRESS" can bring about reductions in *your* true grinding costs.

BAY STATE WHEELS of PROGRESS

BAY STATE ABRASIVE PRODUCTS CO., Westboro, Mass., U. S. A.

Branch Offices and Warehouses — Chicago, Cleveland, Detroit, Pittsburgh
Distributors — All principal cities
In Canada: Bay State Abrasive Products Co. (Canada) Ltd., Brantford, Ont.

Ask for BAY STATE'S "On-The-Job" Engineering Service.

Manufacturers of all types of Quality Abrasive Products

(*Concluded from page* 164)

incorporated in a recently rebuilt and modern, air-conditioned office structure.

For more than 20 years Ross-Meehan has been under the capable direction of one of the industry's outstanding foundrymen. When Gus Meehan died in 1933 his successor as president was Frank M. Robbins, who for a number of years had been vice president of the company. Mr. Robbins joined Ross-Meehan in 1918 as assistant general manager, following seven years with the Marion Malleable Iron Works, Marion, Ind., where he was secretary and sales manager. A past president (1939) of the Steel Founders' Society of America, Mr. Robbins was awarded its Frederick A. Lorenz Memorial Medal in 1940 in recogn'tion of his activities in society affairs.

British Pattern Society Holds First Meeting

The Queens Hotel, Birmingham, England, was the site Apr. 8 for the first meeting of the National Society of Master Patternmakers. Thirty-three firms from various parts of the United Kingdom were enrolled as charter members. This list will remain open for one month, after which firms or individuals will be accepted as regular members.

B. LEVY

The society unanimously elected B. Levy, B. Levy & Co. (Patterns) Ltd., London, to be its first chairman and president. The following members were elected to the executive council:

L. Brown, Premo Pattern Co. Ltd., Birmingham; N. Fisher, Universal Pattern Co. (London) Ltd., London; N. Gott, Hargreaves & Gott Ltd., Birmingham; W. D. Hartley, Fellows & Darby Ltd., Birmingham; E. C. Rowen, Pattern Equipment Co. (Leicester) Ltd., Leicester; R. Sarginson, Sarginson Bros. Ltd., Coventry; R. Scott, H. C. Hopper (Kingston) Ltd., London; R. J. Seymour, Seymour's Castwell Foundry Ltd., Derby; J. Vickers, John Vickers & Sons, Darlington, and A. Whitehouse, Pattern & Model Mfg. Co. Ltd., Coventry.

V. C. Faulkner was elected an honorary member in recognition of the support and work he had given to the organization of the new society.

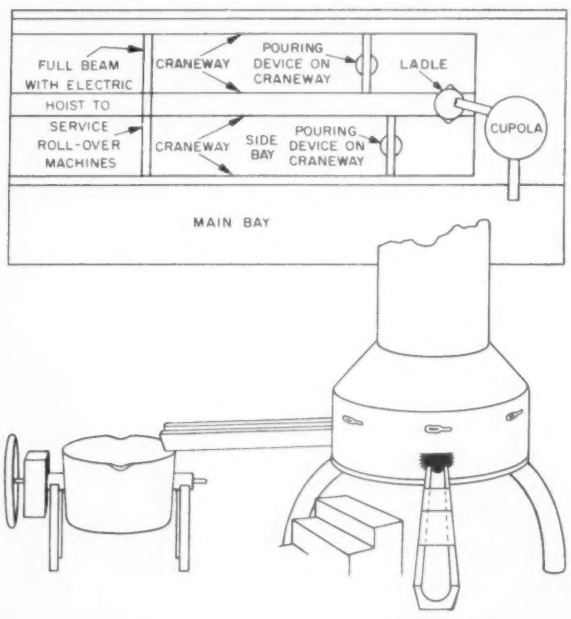
HOW TO DO IT

Second Cupola Spout Delivers Hot Metal to Side Bay of Foundry

By D. W. HARRIS
Tulsa, Okla.

WHEN a cupola is located in the side bay of a foundry and the spout delivers metal only to the main bay, the problem of delivering molten metal back to the side bay quickly and with minimum heat loss sometimes exists. This difficulty was solved in one foundry by adding a second spout to the cupola to supply metal to the side bay.

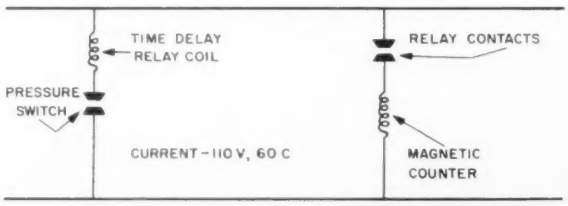
A stationary, geared bull ladle was placed at the auxiliary spout in a sideways position so that metal could be poured both ways to service two pouring ladles suspended from overhead bridge cranes. The cupola tender learned to tap left handed to avoid having to move when he changed from one spout to the other.



Automatic Mold Counter Designed For Use on Squeezer Machine

By ROBERT J. PUTNAM
Industrial Engineer
Kennedy Valve Mfg. Co.
Elmira, N. Y.

HERE'S an automatic mold counter that is simple and foolproof for use on a squeezer machine. A pressure switch is mounted just ahead of the squeeze exhaust valve. When a mold is squeezed, the pressure switch is actuated, starting a time delay relay. The time delay is set at the minimum mold cycle to prevent a double squeeze from double counting. At the end of the delay relay cycle a magnetic counter is actuated from which an accurate tabulation can be taken.



Do you have any tricks of the trade tucked away with your foundry experience? Why not release them to fellow foundrymen? FOUNDRY will pay a minimum of $15 for each idea submitted and published. Send a photo or drawing with your idea

Better castings cost less . . .

with RESINOX

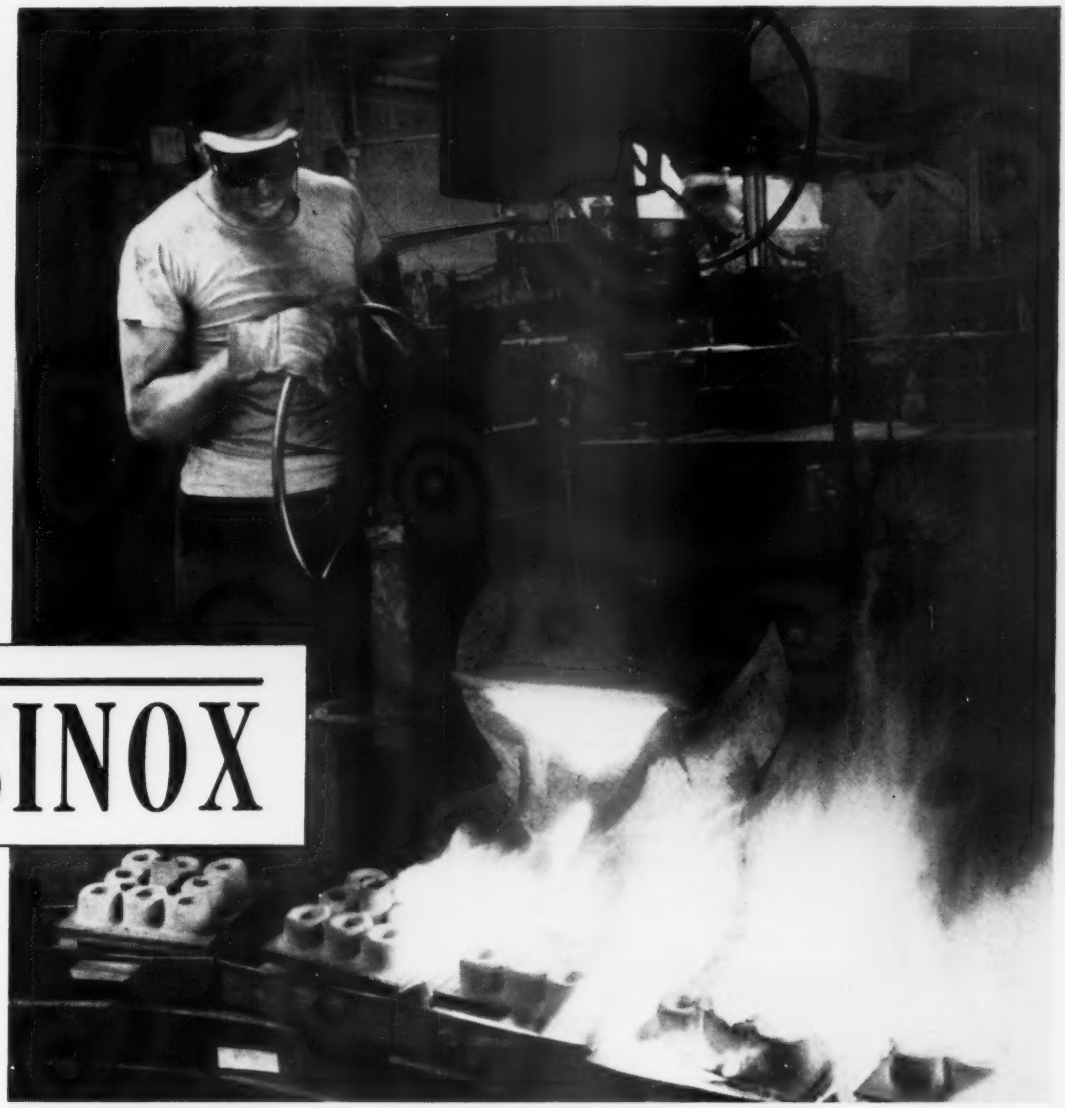


Photo courtesy of Midwest Foundry Company, Coldwater, Michigan

Here are shell molding savings that speak for themselves! 60% saving in production time . . . 80% less machining . . . up to 50% closer tolerances . . . production rates increased threefold . . . labor costs cut in half . . . initial plant cost reduced 25% . . . 14% more metal yield . . . up to 4 times more production per man hour . . . half a million close-tolerance items without a single reject. These are actual results, reported by leading foundries who use *Resinox** shell molding resins.

The quality of the resin is an all-important part of shell molding. And Resinox resins, as used by hundreds of foundries, produce castings with more uniform quality, better finish, far lower reject rate and more accurate dimensions — at impressive savings. Like all Monsanto foundry resins, Resinox is research-developed and shop-tested to meet your requirements.

For information on Resinox shell molding resins, Resinox phenolic and Resimene* urea resins for core binding, and Lytron* sand conditioner for conventional sand casting, mail the handy coupon today.

MONSANTO

SERVING INDUSTRY . . . WHICH SERVES MANKIND

* Reg. U. S. Pat. Off.

MONSANTO CHEMICAL COMPANY, Plastics Division, Room 5707, Springfield 2, Mass.

Please send me complete information on: ☐ Resinox shell molding resins; ☐ Monsanto core binding resins; ☐ Monsanto phenolic resins; ☐ Lytron sand conditioner.

Name & Title

Company

Address

City, Zone, State

Removable Ready-Power Units

give you off-the-truck maintenance

Keep trucks *on the job* where they belong!

If you *like* the simplicity, economy, and full power of gas-electric or diesel-electric drive . . . if you *like* the idea of engine tune-up without truck downtime . . . READY-POWER IS THE ONLY ANSWER. Power units may be installed or removed from trucks *in minutes!* Sizes for all makes and types of electric industrial trucks. Write for details.

READY-POWER

The READY-POWER Co., 3813 GRAND RIVER AVE., DETROIT 8, MICH.

Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units; Gas and Diesel-Electric Power Units for Industrial Trucks

Alloy Casting Institute Elects Officers

C. K. Lockwood, vice president, Stainless Steel & Alloys Division, Shawinigan Chemicals Ltd., Montreal, Canada, was elected president of the Alloy Casting Institute at the close of its 14th annual meeting at Hot Springs, Va., June 29. He succeeds G. A. Baker, vice president, Duriron Co. Inc., Dayton, O.

C. K. LOCKWOOD

A native of Brighton, Ont., Mr. Lockwood was graduated from McGill University with a chemical engineering degree in 1934 and a metallurgical engineering degree in 1935. He joined Shawinigan Chemicals in 1937, became vice president in 1953 and a director this year.

Thomas Rutherford, the Midvale Co., Philadelphia, was elected vice president, succeeding Mr. Lockwood. E. A. Schoefer, Mineola, N. Y., was re-elected executive vice president and treasurer.

Three new members were named to the institute's board of directors. They are: C. M. Ruprecht, president, Electro-Alloys Division, American Brake Shoe Co., Elyria, O.; B. B. Evans, sales manager, Empire Steel Castings Inc., Reading, Pa.; and J. D. Hagans, sales manager, Ohio Steel Foundry Co., Springfield, O.

Reports of research work on cast heat-resistant and corrosion-resistant alloys were presented during the three-day meeting of the institute, technical association of the high alloy foundry industry.

Erects New Plant

Lithium Corp. of America, Minneapolis has started erection of a new plant in Bessemer City, N. C. Financed by private sources the expansion will cost an estimated $7 million. Plant is expected to begin operations Dec. 1.

Outstanding Machinability . . . All-Purpose Economy

APEX Z-33 ALUMINUM ALLOY

A quality all-purpose alloy that gives you outstanding economy on the production line—that's Apex Z-33. Developed by Apex to combine better than average mechanical properties, uniform casting characteristics and exceptional machinability, Z-33 has been thoroughly proved in both foundry and final application. Its as-cast properties are right for most castings, it can be heat treated for highly stressed castings, and it has excellent dimensional stability with an aging treatment. Apex Z-33 takes anodizing and other chemical and electrochemical finishes, responds beautifully to buffing and polishing.

In your profit-minded operation there's a definite place for the versatile, economical applications of Apex Z-33.

Research leadership back of every ingot

Send without obligation for information covering complete specifications and properties of Apex Z-33.

APEX SMELTING COMPANY

CHICAGO • CLEVELAND • LOS ANGELES

INDUSTRY BRIEFS

UNION Malleable Mfg. Co., Ashland, O., plans a major plant expansion program there. Construction is starting on a new foundry on a 50-acre site for the production of pipe fittings, and operations are expected to start next January. With the building of additional manufacturing units the company eventually plans to concentrate its production at the new site. Union has been operating Ashland Malleable Iron Co., a subsidiary, at another address.

* * *

Foxboro Co., Foxboro, Mass., has completed a new 15,000-sq-ft plant in Pittsburgh which will double the company's present instrument assembly, service and repair facilities. The company also opened a new plant in Dallas in April and another in San Leandro, Calif., to be ready for occupancy Aug. 15.

* * *

Carborundum Co., Niagara Falls, N. Y., is establishing a new subsidiary in Puerto Rico to be known as the Carborundum Co. of Puerto Rico. It will manufacture bonded abrasive products and electrical components. Two buildings with floor space of 150,000 sq ft will be located in Mayaguez, P. R. Arturo R. H. Hau will be general manager.

* * *

Olin Mathieson Chemical Corp. has been formed by the merger of Olin Industries Inc., East Alton, Ill. and Mathieson Chemical Corp., New York. Officers of the new firm are John M. Olin, chairman of the board, previously president of Olin Industries, and Thomas S. Nichols, president, previously president and chairman of Mathieson Corp. No changes in basic operations are contemplated and principal offices will be maintained in East Alton, Ill., Baltimore, New Haven, Conn., and New York.

* * *

Consolidated Testing Laboratory Inc., 164 Cherry Valley Rd., West Hempstead, N. Y., has recently been formed for chemical, spectrochemical and metallurgical testing. The company is affiliated with Industrial X-Ray Inc. and Able Laboratory Inc. Arthur J. Mitteldorf, formerly eastern representative of Jarrel-Ash Co., is director of the laboratory. Donald O. Landon, formerly research chemist, Armour Research Foundation, Chicago, is chief chemist.

* * *

Birdsboro Foundry & Machine Co., Birdsboro, Pa., has been purchased, subject to approval of the stockholders, for $3,970,000 by Frederick W. Richmond, New York financier and industrialist. Business will remain at its present location with its present management and personnel.

* * *

Standard Conveyor Co., North St. Paul, Minn., recently dedicated a new two-story office building. The reinforced concrete structure, covering 21,000 sq ft, is air conditioned and has modern lighting throughout with a color scheme designed to minimize eye strain.

* * *

Liptak Furnace Arches Ltd., 68 Victoria St., London, S. W. 1., England, has been purchased by A. P. Green Fire Brick Co., Mexico, Mo. For several years the British company has manufactured refractory specialty products under license from the Green Co., and has designed and supplied suspended refractory arch and wall construction under license from Bigelow-Liptak Corp., Detroit, an A. P. Green subsidiary. It is planned to make the British-made specialties available in all export markets where dollar exchange is unavailable.

* * *

Falk Corp., Milwaukee, has won special honors for an outstanding safety record. Louis W. Falk, vice president in charge of manufacturing, received an engraved plaque from Employers Mutual of Wausau, Wis. Falk's accident frequency rate was cut from 19.2 in 1948 to 7.0 at the end of 1953. The 100 per cent eye protection program started in 1950 has contributed greatly to the improved safety record.

* * *

Schmieg Industries Inc., Detroit 34, has completed an expansion program resulting in a 60 per cent increase in capacity. The company engineers and manufactures dust and fume control equipment, production and finishing systems, spray booths, industrial ovens, mechanical washers, and industrial sheet metal equipment.

* * *

Jack Mahaffey Equipment Co., 1200 Freeport Rd., Pittsburgh, has been appointed sales representative for the Materials Handling Division of Union Steel Products Co., Albion, Mich. It will sell materials handling equipment in the western Pennsylvania area.

* * *

Shieldalloy Corp., 99 Park Ave., New York 16, has appointed Industrial Foundry Supply Co., 1434 Howard St., San Francisco 3, and Gordon Sondraker & Co., 5259 Atlantic Blvd., Maywood, Calif., exclusive agents for its products in northern and southern California, respectively.

* * *

Insley-McEntee Equipment Co., Rochester, N. Y., has been named materials handling agent in ten northwestern New York counties by the Union Metal Mfg. Co., Canton, O., manufacturer of container-type materials handling equipment.

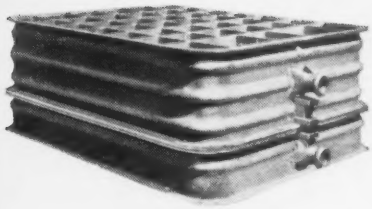
* * *

Long Island Die Casting Inc., foundry and machine shop, 21 Smith St., Inwood, Nassau County, N. Y., has been incorporated, listing capital stock of 200 shares, no par value.

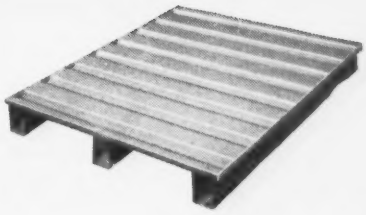
(*Concluded on page* 172)

EXPANDS PLANT: Link-Belt Co., Chicago, conveying, processing and power transmission equipment manufacturer, has expanded its West Coast facilities by construction of a three-story addition to its San Francisco plant at 400 Paul Ave. Manufacturing, engineering and warehouse facilities and a factory branch store are in the new building, part of which is shown at right in photo above. The plant administration building appears at left and the main plant structure is visible in rear

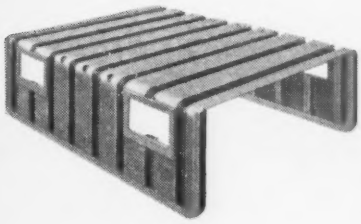
Mold it, Move it, Store it, Ship it



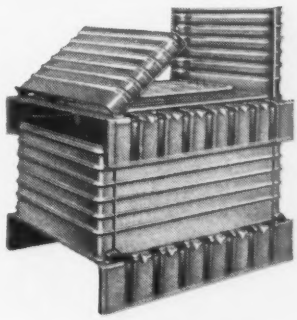
CH-40
Crane Handling Flask



P-12
Single Face Steel Pallet
with Two- or Four-Way Entry



P-3-FHR Skid
with Four-Way Entry



PB-127
Collapsible Box

...with Republic Materials Handling Equipment

REPUBLIC STEEL FOUNDRY FLASKS speed molding efficiency through ease of operation, ease of handling and through long trouble-free service. Republic Flasks are designed and built to meet your specific requirements.

REPUBLIC STEEL BOXES, SKIDS AND PALLETS keep your materials on the move from receiving to shipping. They conserve valuable storage space. Cut your handling costs. Republic Boxes, Skids and Pallets are made in a wide range of sizes to meet the requirements of the individual job.

REPUBLIC MATERIALS HANDLING ENGINEERS are available to help you solve your handling and flask problems. There is no cost or obligation for their services. Let us know when you would like one to call at your plant.

Write for our new catalog No. 620 covering the complete line of Republic Materials Handling Equipment.

REPUBLIC STEEL CORPORATION
Pressed Steel Division
6208 Truscon Avenue, Cleveland 27, Ohio
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N. Y.

REPUBLIC STEEL

REPUBLIC
MATERIALS HANDLING EQUIPMENT

These four important factors should be considered when appraising different kinds of metal abrasives:

Visit
our Exhibit
at the
FOUNDRY SHOW
Public Auditorium
Cleveland, Ohio
May 8-14
Booth 500—North Hall

L/D CUT-WIRE SHOT

for use in:

Metal Blasting
Cleaning
Peening
Tumbling
Cutting
Abrading

Provides:

LONG LIFE
UNIFORM SIZE
UNIFORM HARDNESS
LOWER COSTS

SPEED — Rate at which the work is performed. HARRISON Abrasives provide fast work, with effective abrading action.

FINISH — Appearance produced by the abrasive. HARRISON Abrasives eliminate the dull uneven finish of a soft abrasive.

UNIFORMITY — Close control of particle size. HARRISON Abrasives are closely screened, consistent in analysis.

COST — as a factor in the overall operation. The fast action of HARRISON Abrasives means less cost.

These are some of the reasons why HARRISON Shot and Grit have always led the field for quality and reliability—made by the pioneers in the Metal Abrasive Industry.

Write for—latest Technical Bulletins

HARRISON ABRASIVE DIVISION
METALS DISINTEGRATING COMPANY, INC.
Elizabeth B, New Jersey

HARRISON ABRASIVE FOR METAL BLASTING SHOT GRIT

MD PRODUCTS

HARRISON Chilled SHOT—Diamond GRIT—L/D Cut-Wire SHOT

8026 **SUBSIDIARY OF AMERICAN-MARIETTA COMPANY**

(*Concluded from page* 170)

Directors are Marie, John C., and John Schettino Jr., all of 1279 Westervelt Pl., Hewlett, N. Y. Schettino & Schettino, 398 Central Ave., Lawrence, N. Y., filed the incorporation papers.

* * *

Day Co., Minneapolis, manufacturer of dust control and bulk material storing and handling equipment, has purchased a factory building at 1153 Sixteenth Ave. S. E., Minneapolis. The facilities will provide additional manufacturing space.

* * *

Blackmer Pump Co., Grand Rapids, Mich., has contracted with the Meehanite Metal Corp., New Rochelle, N. Y., to produce Meehanite castings. Blackmer's foundry will produce these castings for use as component parts in its line of industrial pumps.

* * *

J. O. Ross Engineering Corp., 444 Madison Ave., New York, manufacturer of industrial air systems, has moved its Los Angeles branch office to the new Ross plant at 6417 Bandini Blvd., Los Angeles. R. W. Morsch continues in charge of the Los Angeles branch office.

* * *

Engineered Industrial Equipment Co., 30 Goodrich St., Buffalo 3, headed by J. Robert Fisgus with Robert J. Wilks, general manager, William J. O'Rourke, sales, and Peter J. Bermel, field engineer, has been appointed distributor for the American MonoRail Co., Cleveland.

* * *

Palmyra Basic Foundry Inc. has been formed in Whitewater, Wis., to conduct a general foundry business. Incorporation papers were signed by C. J. Heinzelman and Edward B. La Plante, both of Mundelein, Ill., and C. J. Basser, Chicago.

* * *

Milwaukee Flush Valve Co., 301 East Reservoir Ave., Milwaukee, has changed its name to Milwaukee Faucets Inc., to make the name more descriptive of the firm's products, principally plumbing fixtures for the home.

* * *

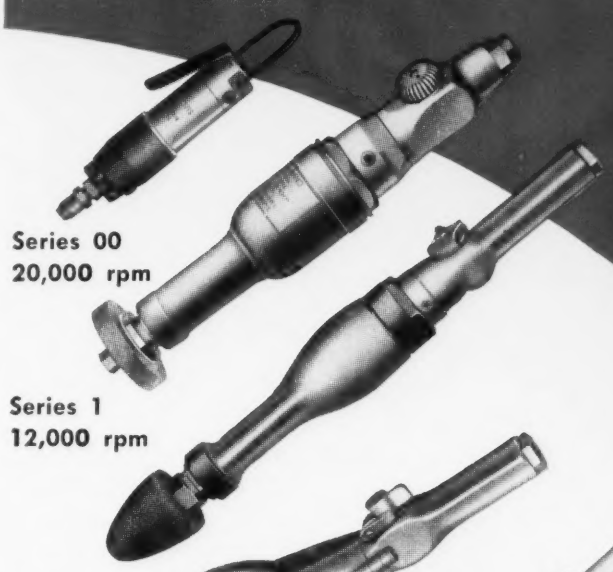
Dow Chemical Co., Midland, Mich., has opened a new field office in Cincinnati at 2330 Victory Parkway. This office will handle Dow's industrial and fine chemicals, plastics, magnesium and agricultural chemicals.

* * *

Papesch & Kolstad, Inc., 10707 Capital Ave., Oak Park (Detroit 37), Mich., has been formed to buy, rebuild and sell all types of heat treating and melting furnaces and allied equipment.

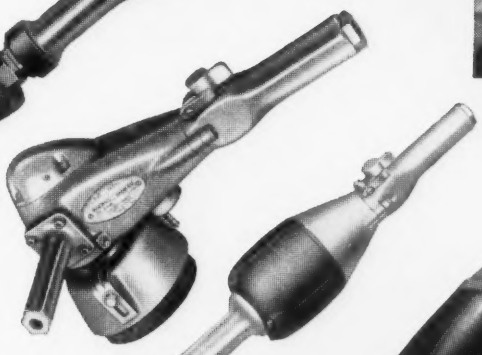
IR AIR GRINDER

Removes More Metal FASTER • EASIER • SAFER at LOWER COST!



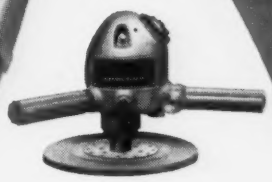
Series 00
20,000 rpm

Series 1
12,000 rpm



Series 2
Cone Grinder

Series 2
Angle Grinder



Series 3
Surface Grinder

Series 3
Straight Grinder
with Arbor
Extension

There's a size and style to fit all your grinding applications!

Series 4
Heavy Duty

Check these advantages over any previous air grinder:

- Over-speed Safety Coupling
- More power
- Quieter exhaust
- Adjustable exhaust positions
- Arbor Bearings are permanently lubricated
- Easier to carry — better balance
- Sure seating rubber-faced throttle valve
- Four types of handles available

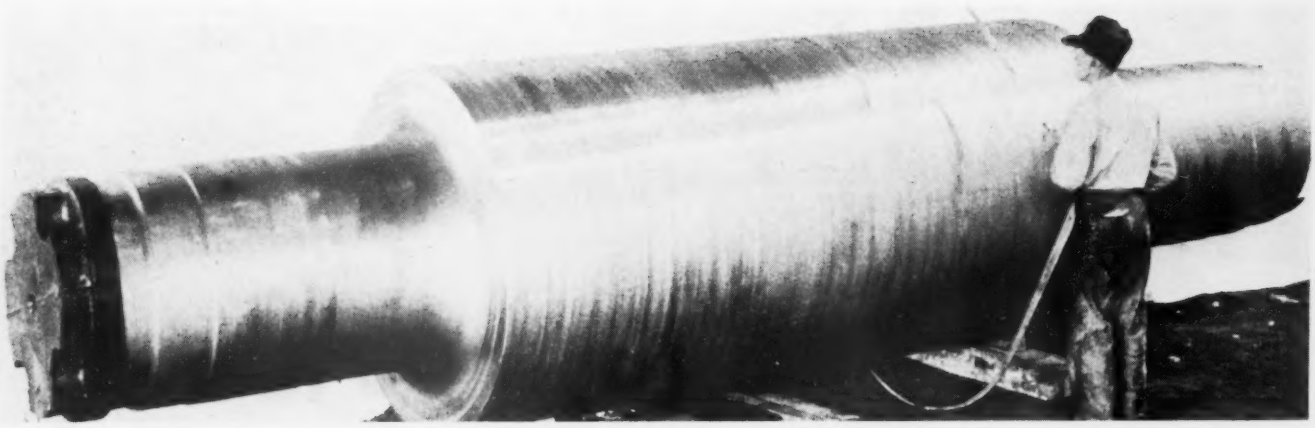
One of our AIR engineers will gladly provide a convincing metal removing demonstration of these powerful grinders. There's no obligation on your part — just phone or write — we'll do the rest.

Ingersoll-Rand

11 Broadway, New York 4, N. Y.

8-95

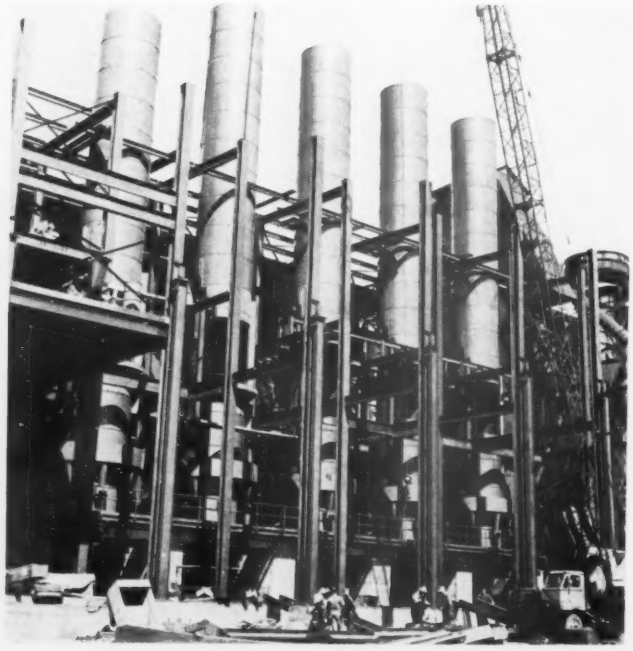
NEWS VIEWS



GIANT ROLL: Giant backup roll, cast, machined, and annealed by Continental Foundry & Machine Co., East Chicago, Ind., in one of its Wheeling, W. Va., plants, is said to be the largest ever made for use in a four-high steel rolling mill. It measures 60-in. in diam and before machining weighed about 185,000 lb. After machining operation was completed, finished weight was 147,000 lb

NEW DIRECTOR: Clyde M. Adams, secretary of Bohn Aluminum & Brass Corp., Detroit, is sworn in as director of Aluminum-Magnesium Div., Business & Defense Services Administration, U. S. Department of Commerce. Mrs. Adams watches in background as BDSA Administrator Charles F. Honeywell administers the oath. Mr. Adams, on leave, replaces R. G. Boyd, Kaiser Aluminum & Chemical Sales Inc.

WELL STACKED: Demand for the products of the oldest and largest foundry in Natal, South Africa, Durban, Falkirk Iron Co. Ltd., caused such a production stepup that native laborers couldn't handle shipments by hand. Fork lift trucks and modern materials handling methods were imported to eliminate bottlenecks, expedite goods in and out of plant and increase storage space by use of proper stacking techniques. Photo by the Towmotor Corp.



MORE BUICKS IN THE AIR: As part of its billion dollar expansion program, General Motors Corp., is adding six cupolas, five shown here, to its Buick foundry at Flint, Mich. Upon completion of the addition this fall, daily capacity will be increased from 1400 to 2800 tons

telling the story of 'dag' dispersions

Compare Your Present Mold Wash With 'dag' Colloidal Graphite

Your Present Wash	'dag' Colloidal Graphite
1. *Fails to prevent all sticking?*	1. Molds, patterns, chills, cores . . . even push pins, shoulder screws, flask pins, and ladle interiors . . . take on a micron-thin, exceptionally slippery, *dry lubricating film that prevents all sticking.*
2. *Difficult to apply?*	2. **'dag'** mold washes can be sprayed on, painted on, or applied by dipping.
3. *Presents production problems?*	3. Speeds parting, assures smoother castings, eliminates binding and stripping. Chills tap off easily.
4. *Smokes?*	4. Water dispersions of **'dag'** Colloidal Graphite eliminate irritating smoke caused by most parting compounds.

More advantages of **'dag'** parting compounds are to be found in Bulletin No. 425-H3. Write for your copy *today.*

dag DISPERSIONS®

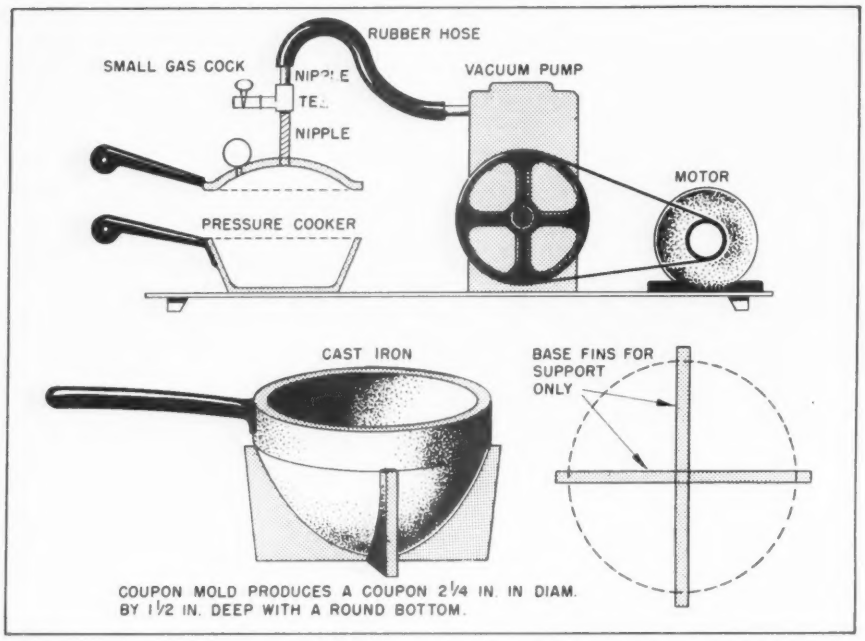
Acheson Colloids Company, Port Huron, Mich.

. . . also ACHESON COLLOIDS LIMITED, LONDON, ENGLAND

UNITS OF ACHESON INDUSTRIES

try 'dag' resin-bonded dry films for permanent lubrication

By C. W. AMMEN



Equipment shown here provides an inexpensive method of determining whether or not degassing has removed absorbed hydrogen from aluminum

Gas Porosity in Aluminum Castings

Removal of absorbed hydrogen from aluminum by flushing the molten metal with an inert gas such as nitrogen requires a means of determining when degassing is sufficient to produce good castings

Dear Charlie:

I've been having a lot of trouble lately with gas porosity in aluminum castings; this trouble has been cropping up every so often. In most cases the pin porosity is clearly visible, but some castings which showed a clean surface when machined leaked when subjected to pressure. I have taken some of the clean castings over to a local university for examination under microscope, and they showed thousands of gas holes dispersed throughout.

I am melting good, clean charges in an open flame reverb of the home brew variety, fired with a brute force burner that also is home brew. I have been using approximately 4 to 6 cu ft of dry nitrogen per 100 lb of melt to degas. Sometimes this does the trick, but only too often I come up with a gassed heat. I am sending Exhibit A, under separate cover.

I was wondering, Charlie, whether in your hoboing around you had ever come across any animal I could build for a few bucks which would let me know whether I have degassed the heat sufficiently to give a better percentage of gas-free castings. I have gone over my gating, molding, etc., and the finger of guilt points to the furnace. Flame is oxidizing. I am looking for a cheap but effective method.

Sam

P.S. How about a list of pedigrees on copper-base scrap as purchased from the scrap dealers?

* * *

Dear Sam:

Well, Sam, received the section of the aluminum casting you are having trouble with. Close examination shows pin porosity finely dispersed throughout. Your melting and molding practice seems to be O.K. from what you write, since you state that this problem is spasmodic and that some castings which apparently are sound and show a clean, machined surface will leak under pressure when put into service.

The practice of degassing with the dry nitrogen you are using at the rate of 4 to 6 cu ft of gas per 100 lb of metal is satisfactory under normal conditions with a 15 to 30-minute settling period, skimming just before pouring and pouring close to the sprue. Aluminum has negligible solubility with oxygen, but will, under the proper conditions, absorb large amounts of hydrogen. This can be removed simply by flushing the molten metal with an inert gas such as nitrogen, helium or argon or by a chemical action of chlorine.

Must Know Quantities

Now here's the rub. You do not know how much hydrogen the melt has or has not absorbed for any given melt. So you don't know how much degassing is sufficient to rid the melt of enough hydrogen to prevent its combination with oxygen to form H_2O, which in turn leads to steam and to our friends the gas holes. I have seen many a heat which by all the rules was melted and degassed properly that produced castings with an over-all dispersion of gas holes that were traced to the melt itself, but only after the castings had been scrapped. Without going into the metallurgical considerations and mechanics of gas porosity, I can say that your problem lies in your not knowing when the heat has been degassed enough to produce the highest percentage of good, gasfree castings.

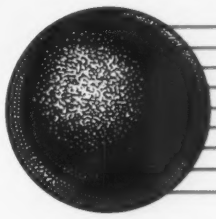
Compound gas (water vapor) formed from the reaction between the hydrogen and metallic oxides is the prime cause of gas porosity. When the concentration of absorbed gas exceeds atmospheric pressure, it then explodes into visible gas holes. This condition might occur in the last stages of solidification, as is seen when a sprue which is shrinking normally suddenly backs up and starts to mushroom and spit, as you undoubtedly have seen them do.

The following equipment will allow you to check the metal at the furnace and actually will accentuate the presence of hydrogen, showing it in amounts below atmospheric pressure. Sam, you can build this equipment for less than $150, and it will save you countless castings. The equipment consists of a vacuum pump, a pressure cooker, a motor and a coupon mold, as per the enclosed diagram.

From the diagram you will see that there are three major pieces—

(*Concluded on page* 178)

AMASTEEL



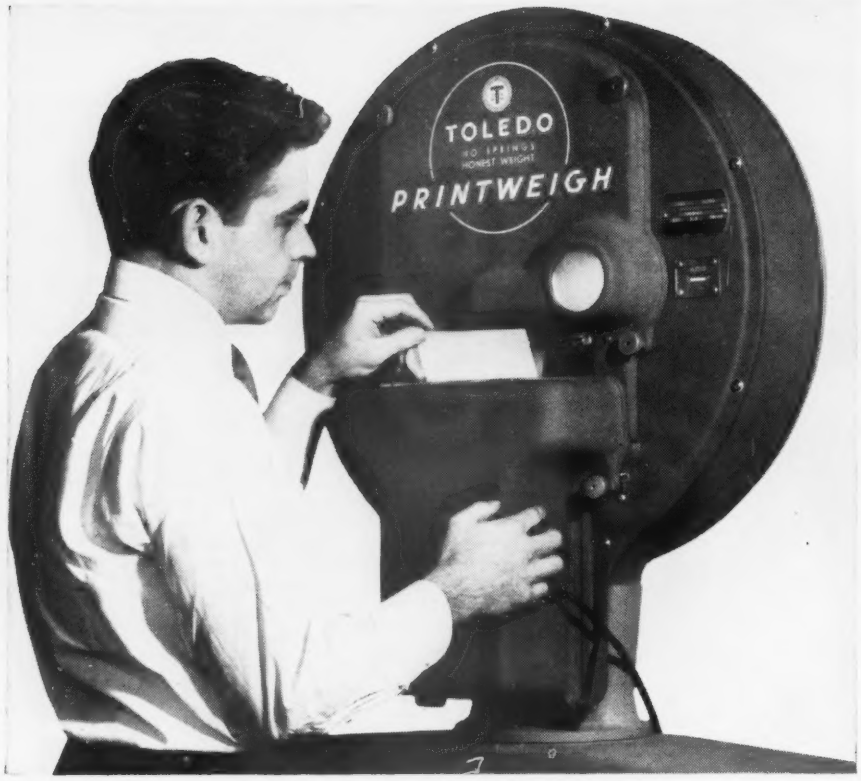
Genuine alloy steel shot

The greatest development in metal abrasives
Will last five times longer than regular shot
Produces a more attractive finish
Reduces maintenance expenses
Requires less storage space
Cuts down length of work cycle
Saves as much as half your shot cost
Produces less dust
Out-performs all shot and grit on every point

ALLOY METAL ABRASIVE CO.

311 W. HURON ST., ANN ARBOR, MICH.

Representatives in most principal cities



Control Today's Costs PRINT the Weight!

New Toledo Printweigh Scales meet your needs today for *closer cost control!* Stop human errors in reading, remembering, recording . . . provide accurately printed weights with split-second speed . . . accurately recorded!

Printweighs are available for dial type scales in the great new line of Industrial Toledos! *44 new features* include . . . new clean-line design . . . double-pendulum mechanism in one-piece sector . . . lifetime fulcrum. Send for new condensed catalog No. 2001. Toledo Scale Co., Toledo 1, Ohio.

READY TO SERVE YOU IN MORE THAN 200 CITIES

For practical assistance in the selection of new equipment—for efficient installation—or for dependable, factory-trained service, look to your local Toledo office as headquarters. Phone there for emergency repairs on all makes of scales. Ask about the economy and assurance of Toledo service agreements for regular, periodic inspection—"the ounce of prevention" that guards essential equipment.

TOLEDO®
HEADQUARTERS FOR SCALES

(*Concluded from page* 176)

a standard, family-size pressure cooker, a small vacuum pump capable of producing 15 to 20 in. of vacuum and a suitable motor. Several pumps are available complete with motor for about $90. Pump and motor are mounted on a suitable base with enough room for the pressure cooker. The stem on the lid of the cooker that carries the check valve is replaced with a short nipple, a tee, a nipple and a gas cock, as per the drawing. If it is desired, a gage can be installed in the place where the little metal safety valve is located. At any rate, this little metal valve is removed; if no gage is used, it is stopped off, or the gas cock is put there, deleting the tee. With this done, a length of strong rubber hose such as that used on blowpipes is attached between the pump and the lid of the pressure cooker. Make sure that the hose is attached to the suction side of the pump and that the pump rotation is correct.

Describes Procedure

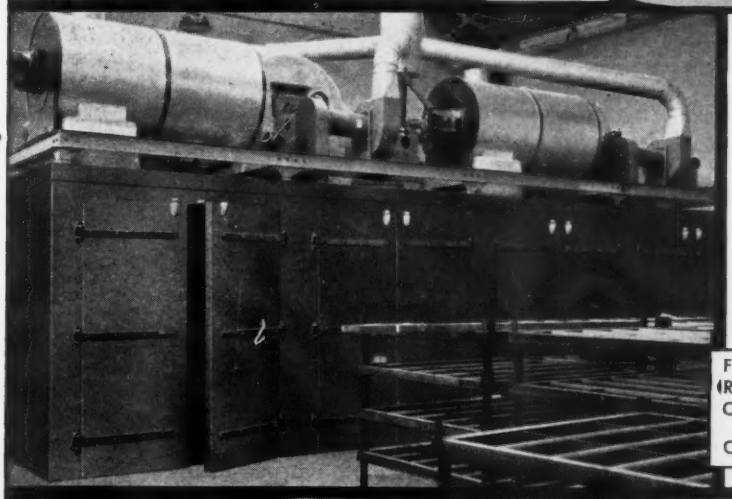
The equipment is used as follows: Place the preheated coupon mold in the pressure cooker and start the pump. The lid should be off, with the relief cock open. With a hand ladle, pour a sample from your degassed heat into the coupon mold in the pressure cooker. Quickly lock the lid on and close the relief cock. Allow the coupon to solidify in the vacuum chamber—about 1½ to 2 minutes. A little fiddling soon will give you the correct timing. Release the vacuum by opening the gas cock, remove the lid, take out the coupon mold and knock out the coupon into a bucket of water. Now section it with a hack or band saw and file smooth one of the surfaces with a vixen file. If the heat still is gassed, porosity will be visible clearly to the naked eye. Degas until a clean vacuum sample is produced.

With a little training, your melter can be taught to take these tests. You will find that this system of vacuum testing will show even very small traces of gas. Heats poured from which clean coupons were taken will produce a greater percentage of good castings. These coupons make excellent samples for etching and for micrographs. I know of two large producers of quality aluminum castings who have used this system for a number of years with excellent results. They check every heat by this method.

Trust that this information will be helpful in reducing your pin porosity troubles.

Sincerely,
Charlie

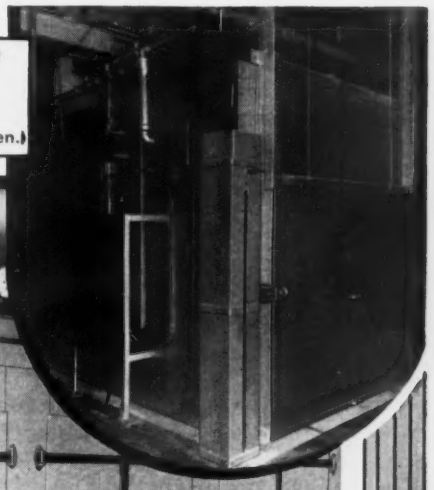
Two Compartment Car Type Mold Drying Oven.
Two Compartment Rack Type Core Oven.
Single Compartment Rack Type Core Oven.
LANLY
FOUNDRY OVENS
THE LANLY COMPANY • 780 PROSPECT AVE
CLEVELAND, OHIO

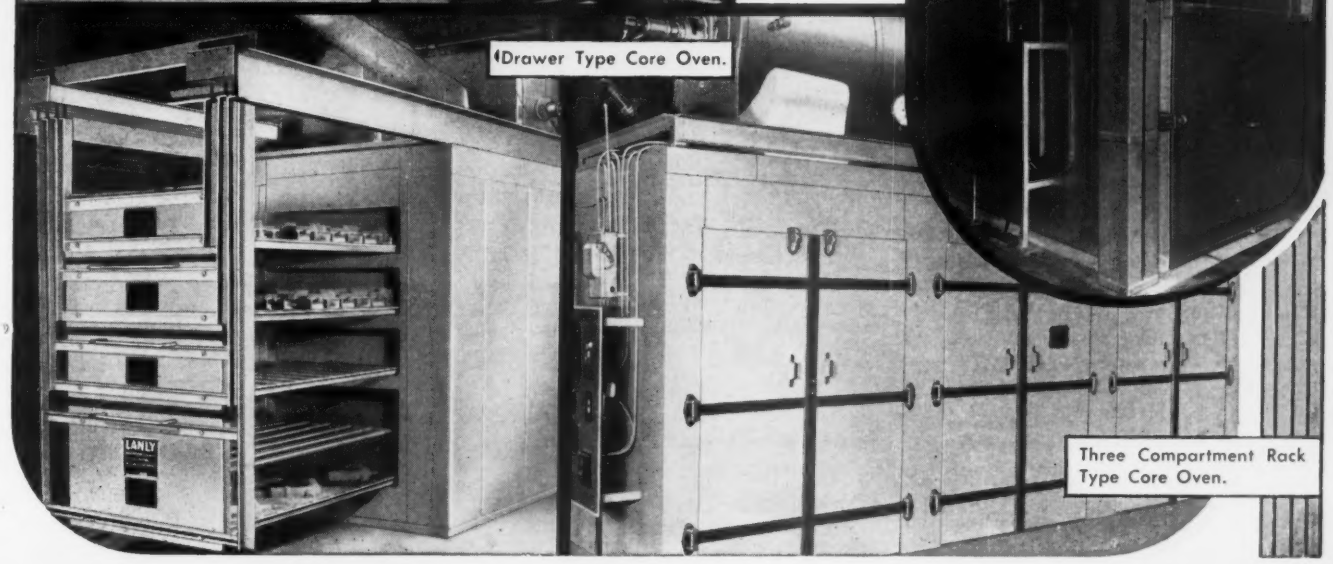


The Lanly reputation has been established as the result of the consistent incorporation of advanced, efficient design and high grade construction into every Lanly installation.

Core baking, pasting and mold drying ovens as well as casting conditioning and heat-treating ovens are available in standard units.

Write for Literature and Complete Information.





"I'll get to BUFFALO ANY WAY ...to get those BETTER BUFFALO PATTERNS"

Foundry men will tell you,
No matter where you go,
They save a lot of money,
With these patterns from Buffalo.

Here engineering minds so smart,
Plan all our jobs right from the start.
And finer CRAFTSMANSHIP, it's true,
Produces patterns JUST FOR YOU!

Buffalo Patterns you will find,
Really give you peace of mind,
Extra rigging is not for you,
And no adapting need you do.

Production schedules hit the top,
Because our work will FIT your shop,
And your scrap ratio DOWN will go,
With these *better* patterns from Buffalo.

Production and Experimental Pattern Equipment • Shell Mold Pattern Equipment and Engineering • Wood and Plastic Models • Jigs, Templates and Target Fixtures • Permanent Molds • Forging and Stamping Dies • Dies for Injection and Reinforced Plastics Molding • Special Precision Parts • Special Machinery and Tooling • Metallizing • Engineering Drawing Service

Be our guest Just let us know when you are coming to Buffalo on pattern business. One of our cars will meet you at your plane or train and transport you to our club where you will be our guest during your stay.

FORMERLY BUFFALO PATTERN WORKS, INC.
NO CHANGE IN MANAGEMENT OR OWNERSHIP

BUFFALO PATTERN CORPORATION
832 HERTEL AVE., BUFFALO 16, N. Y.
DESIGNERS AND MANUFACTURERS OF PATTERN EQUIPMENT FOR OVER HALF A CENTURY

FOUNDRY DEVELOPMENTS

By EDWIN BREMER

Metallurgical Editor

NEW permanent mold process said to be especially suitable for production of steel castings involves use of a graphite mold coated with an aluminum wash. Work so far indicates a minimum life of 500 runs on relatively small molds. Castings produced are said to show dimensional accuracy, smooth surfaces and savings in cleaning costs.

* * *

CONCLUSIONS drawn by J. H. Gittus in a study of "Influence of Mold Factors on Casting Defects," as reported in the April, 1954 issue of the *Journal of Research and Development* (Birmingham, England), are as follows: The composition of the mold influences the soundness of gray iron castings. Dry sand molds produce sounder castings than green sand molds due to their greater rigidity which initially restricts the expansion of hot sand around the casting, causing it to move into the mold cavity and subsequently reduces casting expansion so that the solidifying eutectic expands into and fills the initially formed shrinkage cavity. Hence, the volume of the shrinkage cavity is reduced both by the expansion of the sand and that of the solidifying eutectic. Castings with high graphitic carbon content expand most and have the smallest shrinkage defects. Skin-dried molds and molds containing unexpanded vermiculite tend to produce sounder castings than ordinary green sand molds. Casting expansion is influenced by the moisture content of green sand molds, probably because the sands with the highest moisture content are more easily deformed.

* * *

LARGEST die casting machine ever built, according to reports, now is operating in the Doehler-Jarvis (Toledo, O.) division of National Lead Co. Taking two years to construct, the machine operates at 250-ton pressure, will make aluminum alloy castings up to 75 lb in weight and zinc castings up to 200 lb. Machine is a joint development of Doehler-Jarvis and Kaiser Aluminum & Chemical Corp.

* * *

INVESTIGATION on "Stress Required To Hot Tear Plain Carbon Cast Steel" by Bhattacharya, Adams and Taylor, as presented at the annual meeting of the American Foundrymen's Society, resulted in conclusions that hot tearing occurs at austenite grain boundaries. At elevated temperatures intercrystalline failure results from strain concentration in the grain boundaries and may be aggravated by weak or brittle constituents. Temperature at which tearing occurs depends upon timing and severity of resistance to solid contraction. It may occur after complete or partial solidification and can occur as low as 1700° F. High S and high P steels are weak at elevated temperatures and more susceptible to tearing. Steels deoxidized with 0.025 to 0.05 Al showed lower tearing stresses than those treated with 0.10 Al while 0.2 Ti and 0.1 Al was most effective in increasing tearing stress.

* * *

GRAPHITE nodules may form directly from the liquid or by decomposition of acicular carbide, according to a paper, "Solidification of Nodular Iron," by H. Morrogh which was presented at the recent meeting of the British Iron and Steel Institute. Cooling curves and quenching experiments showed the former while sites of the decomposed carbide were indicated by the segregation of nickel.

* * *

LABORATORY development of a refractory cement claimed impervious to penetration by molten aluminum recently was announced by Electro Refractories & Abrasives Corp., Buffalo, N. Y. Material is designed for application in loop-type electric induction furnaces, and indications are that furnace operating life between relinings will be extended considerably.

* * *

METHOD of reinforcement of cores described in British patent No. 698202 is use of string or fibrous material impregnated with resin. The resin is hardened either by heat or by use of an accelerator prior to insertion in the core. Impregnated string also may be used in the flexible state, which is said to result in an increase in tensile strength as the resin bonds with the core and is hardened during baking. Advantage of resin-impregnated string is that the material decomposes when metal is poured around the core, and is removed with the burned core sand.

* * *

OFFICE of Technical Services, Washington 25, recently has issued report PB 111287 entitled "Development of Composite Spectrophotometric Procedures for the Analysis of Low-alloy Steels and of Aluminum and Its Alloys." It describes methods for determining constituents of the mentioned alloys from a single sample by taking suitable aliquots from the dissolved sample. Elements in steel determined by the method include Cr, Cu, Mn, Mo, Ni, P, Si and V. In aluminum and its alloys they are V, Ti, Ni, Mo, Mn, Fe, Cu and Cr. Price of report is $1.50.

* * *

PAPER entitled "Design and Operation of a Modified Cupola" by F. A. Woolley which was presented at the recent annual meeting of the Institute of British Foundrymen describes a method of applying auxiliary heating to the well of the cupola. Three 6-in.-diam electrodes 120° apart are inserted into the well with the lower sides on a level with the slag hole. Electrodes are connected to a 520-kva transformer with six tappings in 5-v steps from 25 to 50 v. Power is used only as required to keep metal temperature up to desired range. Data show temperature being raised from 2640° F to 2720° F in 45 minutes with consumption of 140 kwh. Equipment is attached to two cupolas melting 8 tons per hr.

* * *

CASTING and heat treating practices that will impart better physical and mechanical properties to ML aluminum alloy (4 Cu, 2 Ni, 2 Mg, 0.3 Mn, 0.3 Cr, 0.05 V, 0.1 Ti) are given in report PB 111329 issued by the Office of Technical Services, Washington 25. Title is "Properties of ML Aluminum Alloy," and points out the alloy must be held at approximately 1500° F for at least 30 minutes prior to chlorination and pouring. Gating and pouring temperatures are similar to those for the Y alloy. Typical tensile strength at room temperature of 33,000 psi in the as-cast state may be increased to 45,000 psi by heat treatment at 950° F and aging at 250° F. Price of the report is $1.

* * *

UNDERCOOLED graphite results from decomposition of carbide, some of which may be formed before the eutectic arrest, according to a study described in a paper, "Undercooled Graphite in Cast Iron and Related Alloys," by H. Morrogh and W. J. Williams which was presented at the recent meeting of the British Iron and Steel Institute. This carbide is hypereutectic in character, from which it derives its acicular appearance. Undercooled graphite in high-silicon alloys can form as a result of the decomposition of a silico-carbide.

WHITING ENGINEERING HELPS

Solve

DIFFICULT SPACE PROBLEM

AT AMERICAN BRAKE SHOE FOUNDRY*

Take a look inside one of Chicago's busiest foundries! See how much action American Brake Shoe crams into 9520 square feet of space. With this total area for molding, charging and pouring, American's production averages 143 tons of castings per eight-hour shift . . . more than 30 pounds of castings per square foot of space!

The reasons? Expert engineering, plus two Whiting Cupolas and a *fast moving skip hoist for charging.* Only two men are now needed for charging operations—*75 per cent less than required by former methods.*

Let Whiting foundry engineering, as typified by this installation, help you now . . . to increase production at lower cost. Write today for complete information.

WHITING CORPORATION

15607 Lathrop Avenue, Harvey, Illinois

* *American Brake Shoe has similar installations at Meadowlands, Pa.; Kansas City, Mo.; Melrose Park, Ill.; Pomona, Calif. and Medina, N. Y.*

WHITING FOUNDRY PRODUCTS INCLUDE:

Cupolas • Cupola Spark Suppressors • Cupola Hot Blast Equipment • Cupola Blast Moisture Control Equipment • Cupola Charging Systems • Cradle Furnaces • Hot Metal Mixers • Duplex Melting Systems • Air Furnaces • Electric Melting Furnaces • Ladles • Ladle Handlers • Ladle Preheaters • Tumbling Mills • Annealing Ovens • Transfer Cars • Pulverizers • Pulverized Coal Firing Systems • Turntables • Electric Traveling Cranes • Trackmobile • Trambeam Overhead Handling Systems • Electric Chain Hoists

1. Whiting double-leaf, drop-bottom bucket at loading zone

2. Bucket on its way up the Whiting skip hoist charger to charging zone

3. Bucket approaches cupola charging opening

4. Having dumped its load, the empty bucket returns for reloading

ACTIVITIES OF FOUNDRY GROUPS

Ontario

FINAL regular meeting for the 1954-55 season of Ontario Chapter of the AFS was held May 28 at the Royal York Hotel, Toronto. More than one hundred couples joined in the ladies night festivities. F. W. Kellam, Electro Metallurgical Co. of Canada Ltd., program chairman, arranged an enjoyable cocktail hour, dinner, dancing, floor show and prizes. Incoming chairman, F. J. Rutherford, Refractories Engineering & Supplies Ltd., was introduced with other newly elected officers.—*M. W. Hollands, General Smelting Co. of Canada Ltd.*

Western Michigan

OFFICERS for the 1954-55 chapter year were elected during the May 3 meeting of Western Michigan Chapter of the AFS at Cottage Inn, Muskegon, Mich. John A. VanHaver, Sealed Power Corp., is the newly elected chairman. Other officers are George W. Bartlett, Neway Equipment Co., vice chairman—program chairman; John B. Powers, Campbell Wyant & Cannon Foundry Co., secretary; and Henry A. Laforet, Lakey Foundry Corp., treasurer.

F. J. DeHudy, Centrifugal Foundry Co., retiring chairman, was elected a director and presented with an honorary plaque. Chapter officers announced that a donation of $1000 was made to the D. J. Campbell Memorial Fund to be awarded to qualified foundry students in the form of a scholarship.

Joseph S. Schumacher, chief engineer, Hill & Griffith Co., was the main speaker on the subject of "Foundry Sands." A lively discussion period followed his talk. C. H. Cousineau, Carpenter Bros., was technical chairman of the evening and introduced the speaker.—*Wilson W. Hicks, Sealed Power Corp.*

SOUTHERN CALIFORNIA Chapter of the AFS held a three-session sand course during May at the University of Southern California, conducted by Frank S. Brewster, Harry W. Dietert Co., Detroit. Above, left to right, are Charles Gregg, Gregg Iron Foundry, chapter chairman, Mr. Brewster and Hubert Chappie, National Supply Co. Photograph through courtesy of K. F. Sheckler, Calmo Engineering Co.

Northern California

NEWLY elected officers for the 1954-55 season have been announced by the Northern California Chapter of the AFS. John Bermingham, E. F. Houghton Co., San Francisco, is the new chairman. Other officers are Clayton D. Russell, Phoenix Iron Works, Oakland, Calif., vice chairman; Davis Taylor, American Wheelabrator & Equipment Corp., San Carlos, Calif., secretary; and Fred A. Mainzer, Pacific Brass Foundry Co., San Francisco, treasurer.

Directors elected for a two-year term incude Nino V. Davi, Pacific Steel Castings Co., Berkely, Calif., Harold E. Henderson, H. C. Macaulay Foundry Co., Berkely, Roy A. Hoag, General Metals Corp., Oakland, and C. R. Tinsley, U. S. Pipe & Foundry Co., Decoto, Calif.—*J. M. Snyder, Joseph Musto Sons-Keenan Co., Abrasive Division.*

Central Illinois

CENTRAL Illinois Chapter of the AFS met in April at the American Legion Hall, Peoria, Ill., to hear Howard H. Wilder, manager, Iron Foundry Division, Vanadium Corp. of America, Detroit, speak on "Gray Iron Metallurgy." Phillip Burchell,

(*Continued on page* 186)

WISCONSIN Chapter of the AFS met May 21 to honor apprentice contest winners and initiate 11 new members into the Old Timers Club. Shown in top view at left are Donald Tetzlaff, Allis-Chalmers Mfg. Co., first place, national apprentice contest, and his instructor, A. A. Boltoni, Milwaukee Vocational School. Other view shows F. H. Dorndorfer, Sterling Wheelbarrow Co., pinning a badge on Frank Becher. In lower left view are some new initiates of the Old Timers Club and at right are winners of the apprentice contests. Photographs are through the courtesy of Walter Napp, Delta Oil Products Co.

Power! Control!! Production!!!

with Schrader Valves

Compressed air, plus automatic control, has given industry a muscle-saving power to produce more economically . . . without fatigue . . . with increased production.

Reliable valves are an absolute necessity. And **Schrader Valves** are the accepted solution, wherever air controls are used. Schrader Valves are designed and built by a company whose success dates back to 1844—more than a century of experience in air control.

In the complete line of Schrader Valves you'll find two-, three- and four-way models . . . for hand, foot, tripper, cam, pilot or solenoid operation . . . for practically any application.

Compressed air has become a *must* in every plant. If you are not now using it, *investigate* it. And—wherever you actually use compressed air—you'll make its use most effective if you use the best valves possible—Schrader Valves.

Find out how you, too, can put compressed air to work to save you money. For details, write—or, if you prefer, fill out the coupon below.

Schrader

REG. U. S. PAT. OFF.

Leaders in air control since 1844

A. Schrader's Son
Division of Scovill Manufacturing Company, Incorporated
465 Vanderbilt Avenue, Brooklyn 38, N. Y., Dept. M-4

I am interested in more information on _____.

Name _____ Title _____

Company _____

Address _____

PHILADELPHIA Chapter of the AFS held its May meeting in the Engineers Club and heard talks on the "C" and "D" processes of shell molding by Kenneth Davis, foundry superintendent, Budd Co., and Warner Bishop, manager, Foundry Products Division, Archer-Daniels-Midland Co., Cleveland, respectively. Above left, Robert J. Buckenbill, left, Dodge Steel Co., steel molding national apprentice contest winner for the second consecutive year, receives a check from Daniel E. Best, chapter vice chairman. Above right, left to right, are Mr. Davis, W. Donald Bryson, Philadelphia Bronze & Brass Corp., technical chairman for the meeting, Mr. Bishop, and Charles O. Butler, Palmyra Foundry Co. Photographs are by courtesy of Leo Houser, Dodge Steel Co.

(*Continued from page* 184)

Pekin Foundry & Mfg. Co., technical chairman, introduced the speaker.

Officers for 1954-55 were elected as follows: Burton L. Bevis, Caterpillar Tractor Co., chairman; Roy F. Heiden, Galva Foundry Co., vice chairman; and John F. Kauzlarich, Peoria Malleable Castings Co., secretary-treasurer. Larry Kinsinger, Caterpillar Tractor Co., was appointed a director for one year. John Hrvatin, Caterpillar Tractor Co., and Ralph Greene, International Harvester Co., were elected directors for three years. *—John F. Kauzlarich, Peoria Malleable Castings Co.*

Washington

ABOUT 75 members of Washington Chapter of the AFS, their ladies and guests, gathered at Bremerton Elks Club in May to enjoy cocktails, a chicken dinner and an evening of dancing. Selections by a Scottish bagpiper were the entertainment highlight of the program.—*Edmund F. Riedle, Puget Sound Naval Shipyard*

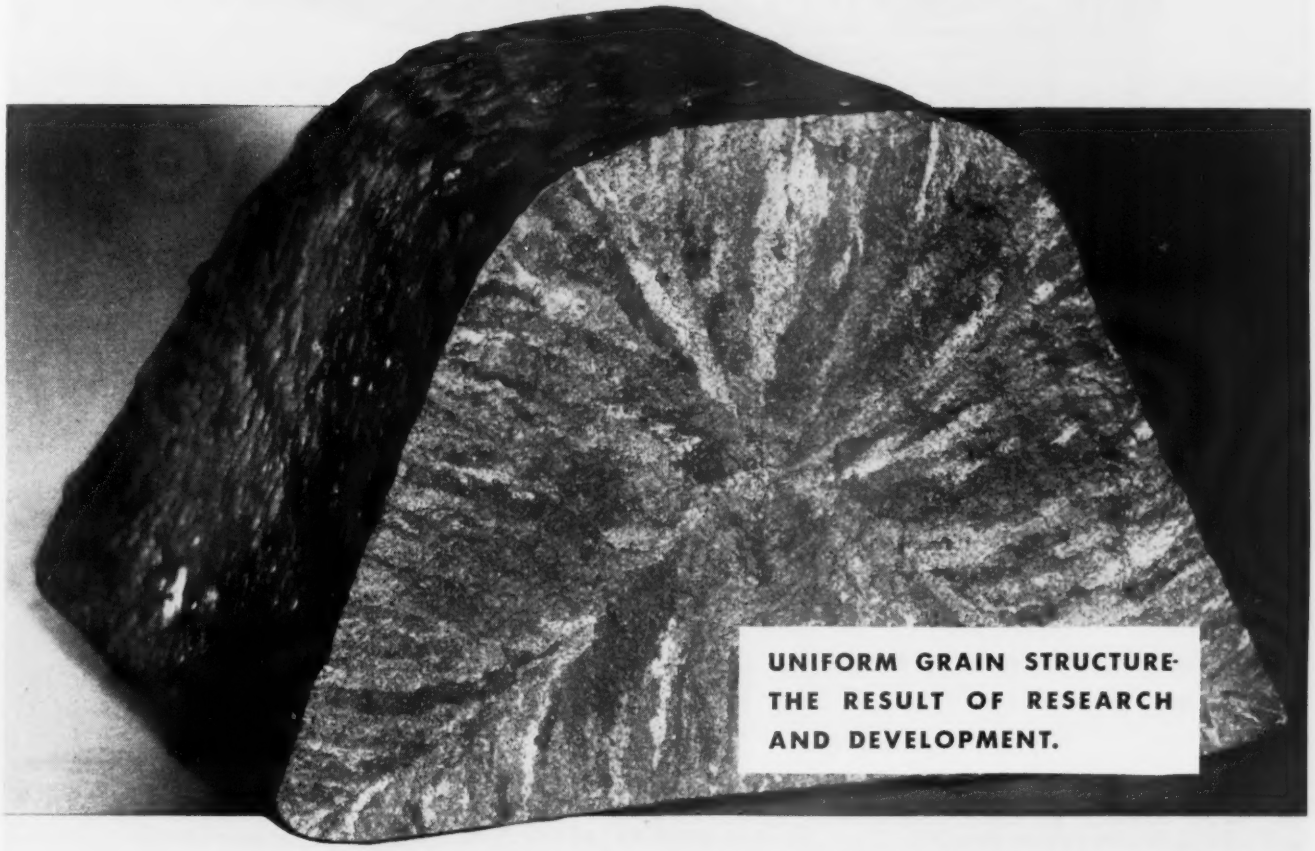
Cleveland Non-Ferrous

SEVENTY-FIVE members of Cleveland Chapter of the Non-Ferrous Founders' Society held a golf party and dinner at Ridgewood Country Club, June 18. Door prizes, free refreshments and entertainment were included in the program. Several past presidents of the chapter were awarded plaques in recognition of their

(*Continued on page* 189)

NEW ENGLAND FOUNDRYMEN'S ASSOCIATION held its annual summer outing June 9 at Wachusett Country Club. Shown at lower left are Henry Stenberg, Draper Corp., chapter chairman, and friends. Lower center view pictures L. P. Robinson, Archer-Daniels-Midland Co., Cleveland, and Thomas Curtin, Waltham Foundry, chapter secretary-treasurer. Lower right view depicts, left to right, J. B. Stazinski, General Electric Co., chairman, 14th New England Regional Foundry Conference, and friends. The other views show other association members at outing. Photos by C. A. Wyatt, Debevoise-Anderson Co.

get positive silicon control with *GLOBE SILVERY*



the originators of Silvery Pig Iron assure economical and dependable control

Our experienced Metallurgical staff is available to help you select the correct grade of Silvery that best meets your specific requirements.

Globe produces all grades of Virgin Ore Silvery Pig Iron, and Electric Furnace Ferro-Silicons.

Globe Iron Company originated Silvery Iron and for over 80 years has been in a class by itself—often copied, but never equaled.

We invite you to write us direct for technical or other information

globe iron company JACKSON, OHIO

SILVERY PIG and FERRO-SILICONS
GLOBE
SINCE 1872

SALES REPRESENTATION

PICKANDS, MATHER & CO.; Chicago, Ill., Cleveland, O., Erie, Pa., St. Louis 1, Mo.
CLEVELAND-CLIFFS IRON CO.; Cleveland 14, Ohio
KERCHNER, MARSHALL & CO.; Cleveland 14, Ohio
MILLER AND CO.; Chicago 4, Ill., and Cincinnati 2, Ohio

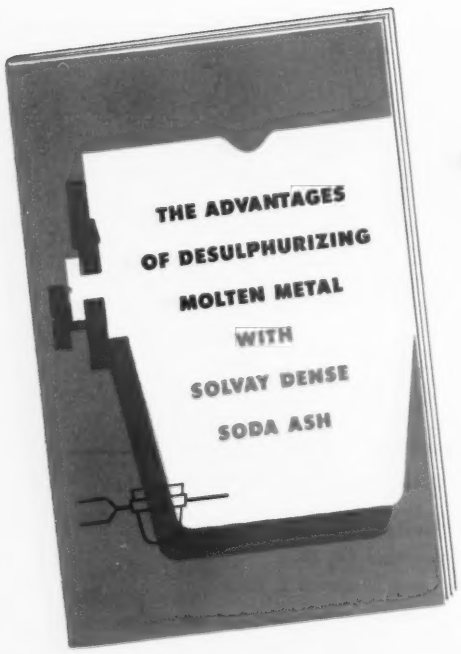
For sales information, contact our nearest Sales Representative.

Desulphurization with SOLVAY DENSE SODA ASH

✓ Offers Many Advantages

✓ Costs Less

SOLVAY DENSE SODA ASH is especially effective for desulphurization. This 100% active material helps produce better, more fluid metal . . . and gives you these other advantages: it's free-flowing; the small grains melt very rapidly, allowing faster, more uniform dispersion; and it's easily added by means of simple equipment. The use of Solvay Dense Soda Ash is a flexible one—you use only as much as you need. And remember, Solvay Dense Soda Ash is the *low cost* form of desulphurization!



Further Information Contained in Valuable Book—Available on Request

"The Advantages of Desulphurizing Molten Metal with Solvay Dense Soda Ash" has been published by Solvay for the benefit of the foundryman. It contains important information on the advantages you can gain by desulphurizing with Solvay Dense Soda Ash. It also explains what type of equipment is needed and how to obtain it. This book is available free—on request—by simply writing to Dept. AT-8, Be sure to get your copy.

SOLVAY

SOLVAY PROCESS DIVISION

ALLIED CHEMICAL & DYE CORPORATION

61 Broadway, New York 6, N. Y.

BRANCH SALES OFFICES:

Boston • Charlotte • Chicago • Cincinnati • Cleveland • Detroit • Houston
New Orleans • New York • Philadelphia • Pittsburgh • St. Louis • Syracuse

Soda Ash · Caustic Soda · Potassium Carbonate · Calcium Chloride · Chlorine
Caustic Potash · Cleaning Compounds · Ammonium Bicarbonate · Sodium Nitrite
Sodium Bicarbonate · Snowflake® Crystals · Para-dichlorobenzene · Monochlorobenzene
Ortho-dichlorobenzene · Ammonium Chloride

(*Continued from page* 186)
service. The custom will be continued annually. Those honored were E. L. Frantz, Apex Electric Mfg. Co., D. B. Kennedy, Gluntz Brass & Aluminum Foundry Co., R. T. Maneely and E. J. Reich, Hoffman Bronze Foundry Co., W. S. Beckenbach, Clark Cable Corp., and B. E. Weimer, Wellman Bronze & Aluminum Co.

New England

FINAL meeting of the year of the New England Foundrymen's Association was held May 19 at the University Club, Boston. A large crowd gathered to enjoy a smorgasbord dinner and listen to reports of members who attended the AFS convention in Cleveland the week previous.—*Alexander Beck, Whitman Foundry Inc.*

Mexico City

MEXICO CITY Chapter of the AFS held its regular meeting in Mexico City June 9 and heard a talk by Ing. Crispin Martinez on the "Design, Construction and Operation of the Cupola." A film on electric welding also was shown. The July meeting was to be held in Puebla, Mexico.—*N. S. Covacevich, Cia Proveedora de Industrias, S. A.*

Wisconsin

HOTEL Wisconsin, Milwaukee, was the scene May 21 of the old timers and apprentices meeting of Wisconsin Chapter of the AFS. Eleven new members were initiated into the Old Timers Club, membership of which now totals 174, of whom 30 are over 80 years old, and 42 are reported to be still at work.

Cash prizes were distributed to 14 apprentices who won honors in the chapter and national competition. In Wisconsin indentured apprentices must attend the Milwaukee Vocational School eight hours per week until they have 550 hours of their time served in foundries or pattern shops, where they receive a wage approximating 65 per cent of the journeymen's pay rate. Pay scale varies with different foundries and pattern shops. Under Wisconsin law, all foundries must work under the Wisconsin Industrial Commission Code. Apprentices start at age 16 to 24. They sign for 832 hours training, depending upon education and progress they make during various periods.

Charles Zahn, superintendent of foundries, Vilter Mfg. Co., has served ten years as co-chairman and for five years as chairman of the old

(*Concluded on page* 192)

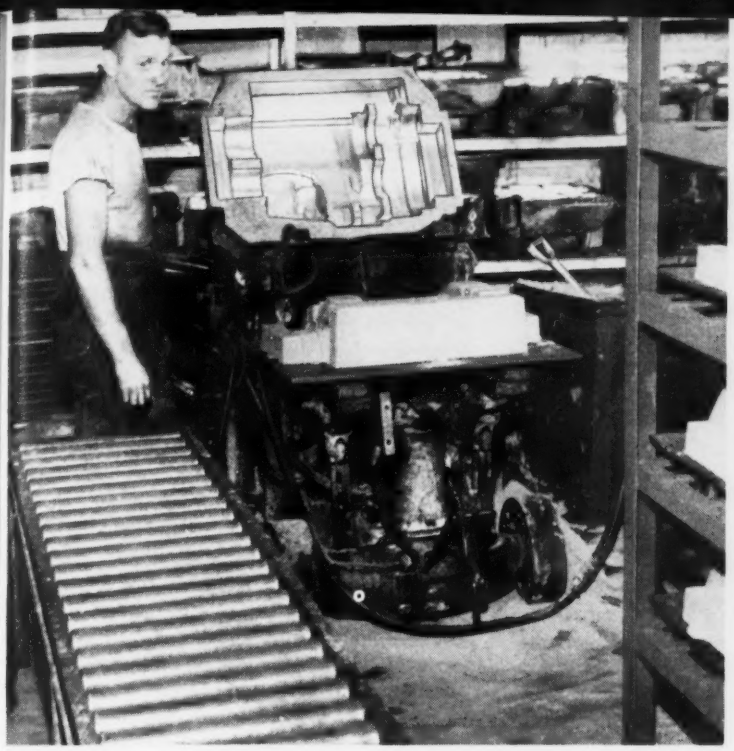
MICHIGAN STATE COLLEGE Student Chapter of the AFS held its annual Student-Industry banquet May 27 at Kellogg Center on MSC campus. Gosta Vennerholm, metallurgist, Ford Motor Co., spoke on "Application of Foundry Practices to Automotive Engineering," and John Smith, plant manager, Chevrolet Gray Iron Foundry, awarded 13 Foundry Educational Foundation scholarship certificates to MSC students. Shown above are the newly elected student officers for 1954-55. Left to right, C. J. Thomas, chairman; Thomas J. Linton, vice-chairman; Mr. Vennerholm; Jacob Goldberg, corresponding secretary, and Richard Morris, secretary-treasurer. Photo through courtesy of Michigan State College

NORTHEASTERN OHIO Chapter of the AFS met in Cleveland May 20 to elect new officers, honor the old timers, and enjoy a program of professional entertainment. Nine past presidents were among those attending this final meeting of the 1953-54 season. Depicted above are some of the old timers present at the meeting. Photographs are through the courtesy of S. N. Farmer, Sand Products Corp.

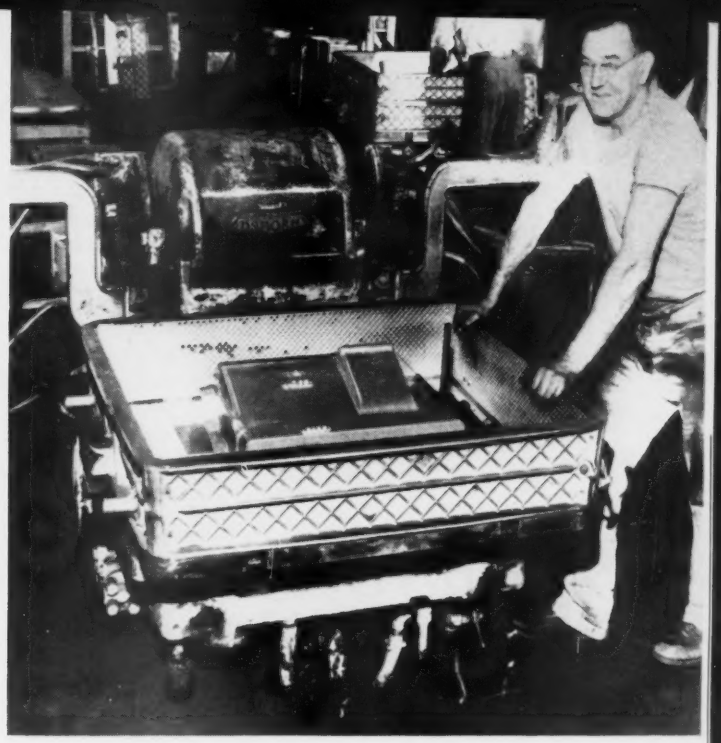
For quality castings at low cost

THEY COUNT ON OSBORN

Automotive transmission castings produced by this large Midwestern foundry meet rigid specifications for quality and uniformity.



For Cores. Fast, efficient production of top-quality large dry sand cores is accomplished with Osborn No. 444 Jolt Rockover Draw Machines. Performance records bear out Osborn machine dependability day after day.



For Molds. Teams of Osborn Jolt Rockover Draw Machines and Jolt Strippers produce drags and copes, maintaining close tolerances for size and uniformity of molds.

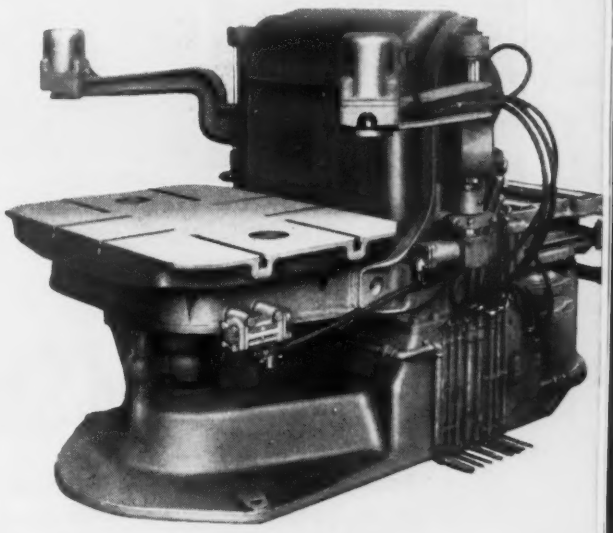
Low costs start with OSBORN dependability

THE ability to operate continuously . . . day after day . . . is why so many foundries prefer Osborn molding equipment. It is the reason why *you* should be considering OSBORN for your molding and core blowing needs.

This producer of automotive castings, for example, has specified Osborn machines for making *both* molds and cores. And for good reasons.

Performance reports show Osborn Molding Machines and Core Blowers operate at greater profit . . . turn out better molds and cores, in record time and without delays in foundry schedules.

Osborn's dependability is no accident. It comes from rugged designs, backed by top-quality materials . . . precision workmanship. Have an Osborn factory-trained representative survey your foundry operations. He can show you how to save money while improving the quality of your production.



Osborn Model 643 Jolt Rockover Draw Machine. One of a complete line of molding machines and core blowers.

THE OSBORN MANUFACTURING COMPANY
5401 Hamilton Avenue *Cleveland 14, Ohio*

OSBORN

MOLDING MACHINES CORE BLOWERS

Another example of
Osborn leadership
and advanced engineering

(*Concluded from page* 189)
timers and apprentices committee of the chapter. He presided again this year. *John E. Hubel*

Southern California

SOUTHERN California Chapter of the AFS held its June meeting at Rodger Young Auditorium, Los Angeles. The meeting was the annual occasion to honor old timers. A. Zima, International Nickel Co., gave a brief talk on behalf of all past presidents.

Chairman-elect Charles R. Gregg, Gregg Iron Foundry, introduced officers elected for the new season.

Lt. Don Blake, U.S. Naval Reserve, one of the originators of under-water demolition teams known as "frog men," presented an interesting narration on this fascinating subject.

The chapter will hold its 19th annual summer picnic Aug. 14 at Lakewood Country Club. Free beer, hot dogs, golf tournaments, horse-shoe pitching contest and other games are on the program.—*Otto H. Rosentreter, National Engineering Co.*

WAYNE CRANE

. . . first choice as an industrial yard crane because it has

Rugged Stability!

"Four-point suspension," exclusive with Wayne Crane, keeps the upperworks level . . . provides maximum stability for operation even on rough ground.

Rated at a full 10-ton capacity, the Model 20's exceptionally short wheelbase and turning radius make it highly maneuverable in the *"tight spots."*

Before you buy — compare — you'll see why you can't beat the performance of a Wayne Crane!

WAYNE CRANE
Heavy-Duty
INDUSTRIAL CRANES
8 to 12½-ton capacity

Also available: 8-ton Model 66 crawler-mounted
12½-ton Model 40 truck-mounted

FREE—Write today for a copy of the new "Handbook of Data for the Proper Selection of Industrial Yard Cranes."

WAYNE CRANE DIVISION
AMERICAN STEEL DREDGE CO. INC. • FORT WAYNE 1, INDIANA

Safety Works

(*Continued from page* 83)

The training of supervisors as well as of employees is one of the most important features of our accident-prevention program. Although Continental has had foreman training programs for many years, the correlation of training and safety was emphasized beginning in the spring of 1952 when a full-time director of training and safety was assigned on a company-wide basis. For the past two years we have included discussions of the various phases of accident prevention in our supervisory conferences. Last year, while the Steel Founders' Society safety contest was being conducted (June, July and August), special supervisory safety conferences were held in all of our plants.

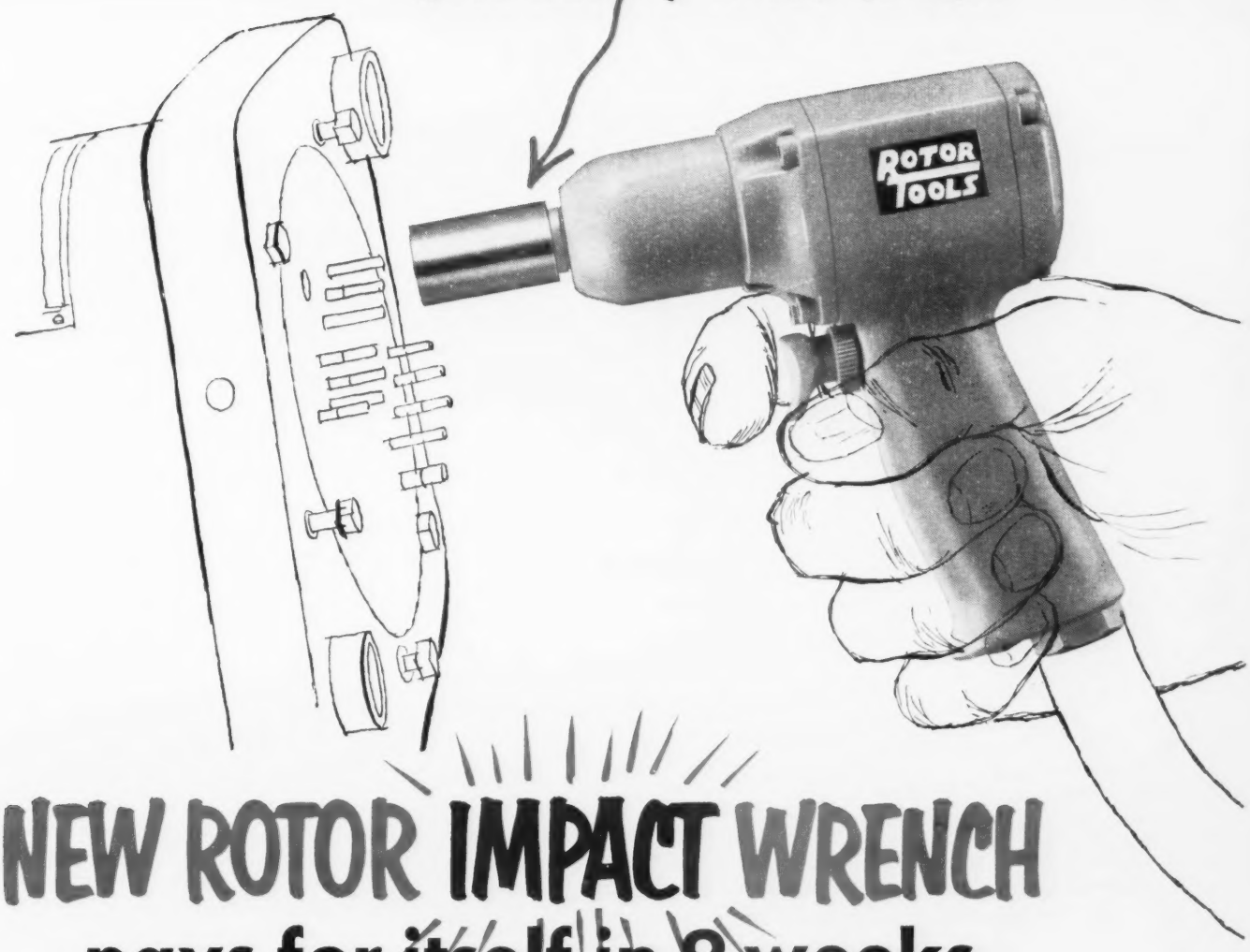
In these conferences the records for the individual plants were discussed, and suggestions were made as to how supervisors could increase their effectiveness in the prevention of accidents. Obviously it is impossible to measure accurately the value of such conferences. We do know, however, that each of our three plants won a Certificate of Achievement in the 1953 contest, the first time that all three had been given recognition in one year. We feel certain that there must have been some relationship between our safety training activities and the results obtained.

As a particular indication of the effectiveness of a safety training program with a definite objective, I would like to recite our experience in the training of chainmen. Our foundries are all jobbing foundries which for the most part make relatively large castings. The movement of materials and of the work in process plays an important part in our every-day operations. During the first nine months of 1952, there were 11 lost-time accidents among the chainmen in one of our plants. After careful study and planning, a safety training program was set up in an attempt to reduce the number of accidents in this occupation.

Training sessions, including both talks and actual demonstrations, were arranged for all our chainmen on each shift. During the last three months of 1952, only one lost-time accident involved a chainman. In the entire year 1953 there were only four lost-time accidents involving chainmen. This, it will be noted, compares with the total of 12 in the previous year, with operating conditions practically identical. The same type of training has been extended to other specific occupations, and we are firmly con-

(*Concluded on page* 194)

Sets nuts 4 times as fast



NEW ROTOR IMPACT WRENCH

pays for itself in 9 weeks

JOB: Setting hex and socket nuts in gearless drill heads. Tool used only 25% of productive time.

FORMERLY: By hand. Required 2 minutes per head. Often scored finished surface.

NOW: Use new Rotor J-2 Impact Wrenches. Time cut to 0.5 minute.

RESULTS: 4 times as fast. Savings paid for new Rotor Wrenches in 8.7 weeks. Eliminates scoring of surface.

A demonstration in your shop can show how these new Rotor tools can save *you* money! No obligation. Call your nearby Rotor analyst!

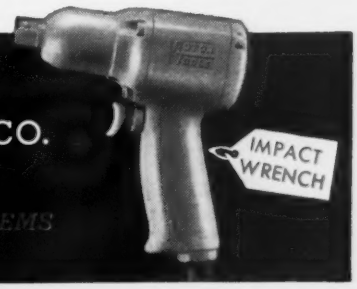
Gives you 2100 solid blows per minute to KO your high costs.

ASK FOR BULLETIN No. 41

THE ROTOR TOOL CO.

CLEVELAND, OHIO

UNBIASED ANALYSIS OF PORTABLE TOOL PROBLEMS



IF YOU WANT LOWER CLEANING COSTS, THEN YOU WANT A STEEL SHOT THAT GIVES YOU ALL THIS!

- **Maximum cleaning speed**
- **Longer abrasive Life**
- **Minimum parts wear**
- **Low purchase price**

TRU-STEEL is that kind of steel shot. Controlled chemical analysis has made Tru-Steel a high-carbon steel shot of tool steel quality . . . with the proper hardness for fast, thorough cleaning. And Tru-Steel *lasts* because it's scientifically heat-treated and drawn for maximum toughness. Machine parts last longer, too, because Tru-Steel does not break into fines that cause wear.

Cost? Thanks to new equipment and improved manufacturing techniques, Tru-Steel's purchase price is lower* than any other steel shot of comparable analysis and heat-treatment. In other words, you get the best for less. Compare costs yourself and see.

Sound logical? Write us today. We'll be glad to send you full information and prices.

*In sizes most popular for blast cleaning.

STEEL SHOT PRODUCERS, INC.
BUTLER, PA.

Subsidiary of Pittsburgh Crushed Steel Co., Pittsburgh, Pa.

Oldest and largest manufacturers of metal abrasives in America

(*Concluded from page* 192)

vinced that it has done much to reduce our accident frequency.

Clean-up Helps Safety—One other activity into which we have entered is based on the theory that safety and an orderly work-place go hand in hand. For the past year we have been conducting "good housekeeping" contests in our plants. The details of the contests are different in each case, having been developed in the plant by the local operating and safety supervisors. Each contest has been most effective, however, and certainly has resulted in an improvement in working conditions.

Prior to the initiation of our housekeeping contest, about the only time a foundry received a good clean-up was during our spring clean-up campaign and when some special visitation demanded it. Now, with regular monthly inspections so scheduled that the supervisor and his employees never know when an inspection will be made, we find that our plants are kept consistently cleaner and more orderly—and therefore are more safe.

These are some of our experiences in the drive which produced the 1953 frequency of 7.86. We are firmly convinced that the foundry can be a safe place to work. We know, however, that achieving this goal will not just happen. Every one must work hard at accident prevention. Making the foundry a safe place to work is not a condition which can come overnight. It requires the constant vigilance of all supervisory personnel from top to bottom and the co-operation of the employees themselves.

Management Society Sets Clinic for Chicago

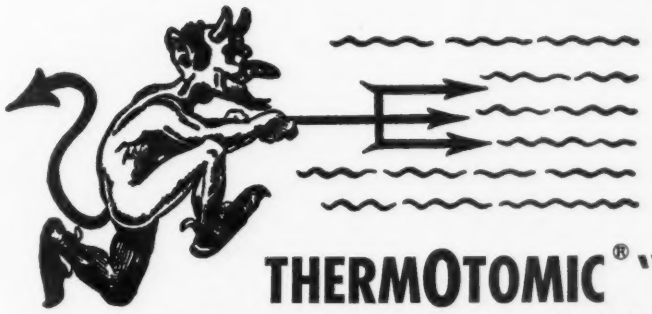
More than 2000 industrial engineers, works managers, plant superintendents and supervisors are expected to attend technical sessions and industrial exhibits at the 18th annual Time and Motion Study and Management Clinic of the Industrial Management Society at the Sherman Hotel, Chicago, on Nov. 10-12.

Industrial leaders from all over the U. S. will discuss latest developments in the fields of time study, motion economy, job evaluation, methods, plant layout, materials handling and human relations.

Feature of the event will be the annual methods improvement contest, with awards to companies and colleges for outstanding advances in industrial engineering techniques and applications. Inquiries may be addressed to the Industrial Management Society, 35 East Wacker Dr., Chicago 1.

Produce More Castings Per Heat

with



Soffel's

THERMOTOMIC® "HOTOP" LIQUIDIZER

Exothermic Carbon Free Liquidizer For Iron, Steel, Nodular Iron

This new head compound saves feeding metal in risers or feeding heads which can now be reduced in height 40 to 70%

SOFFEL'S THERMOTOMIC HOTOP CARBON FREE LIQUIDIZER is different from other head compounds in that HOTOP LIQUIDIZER does NOT contain powdered metal, is NOT a thermit compound. It is a patented exothermic compound entirely free of carbon, sulfur and phosphorus and can be used without danger of contamination on any ferrous metal or alloy.

HOTOP LIQUIDIZER also saves molding time as less sand is needed in the mold cope due to short height of risers. HOTOP LIQUIDIZER produces a liquid slag well over 4000° F. of heat and insulates the metal. The feeding metal will remain liquid at least 50% longer assuring adequate feeding while the casting cools and solidifies. Piping and shrink cavities caused by premature freezing of the feeding metal are eliminated.

GUARANTEED TO PRODUCE SOLID CLEAN CASTINGS

SOFFEL'S FAMOUS CARBON FREE LIQUIDIZER FOR ALL METALS and ALLOYS

SOFFEL'S EXOTHERMIC CARBON FREE LIQUIDIZER is the leader in major foundries for use on both ferrous and non-ferrous metals and also in ingot production. It is the original scientific non-carbon, exothermic compound for feeding heads and risers.

When applied on the heads or risers CARBON FREE LIQUIDIZER reacts within itself exothermically, producing a temperature above 3200° F. It actually increases the temperature of the feeding metal to a point well above that of the metal in the main body of the casting, thus ensuring that the feeding metal will be the last to freeze. In this manner, shrink cavities in the casting caused by premature freezing of the feeding heads will be eliminated. After the exothermic action has ceased, the LIQUIDIZER forms a soft refractory insulating blanket on the metal. This confines the heat generated by the LIQUIDIZER and aids in maintaining the desired high temperature of the feeding metal in the heads or risers.

SOFFEL'S THERMOTOMIC COMPOUND
PATENTED
FOR ALL METALS and ALLOYS

THERMOTOMIC COMPOUND is a patented Exothermic compound that can be molded into any desired shapes and used as feeding ring inserts under risers or as facing application where it is desired to maintain fluidity of the casting metal. THERMOTOMIC permits reversal of the trend towards large feeding heads and risers, making it possible to use heads that are shorter and more compact with 1½" feeder openings. This permits easy removal of the casting feeding heads and sharp reductions in cleaning and finishing costs. When THERMOTOMIC is used as inserts or as facing mixed with molding sand in the mold, heat at thin metal sections is retained until the thick main body of the casting has solidified, thus eliminating shrink cracks and improving grain structure and tensile strength. For use in green sand molds, use THERMOTOMIC W. P. (Waterproofed)

NOTE: SOFFEL'S CARBON FREE LIQUIDIZER NO. 5 is recommended for use on top of feeding heads in conjunction with THERMOTOMIC COMPOUND. For aluminum castings, use THERMOTOMIC ABC and AL-X31 LIQUIDIZER. When ordering a trial sample, advise the kind of metal to be used on.

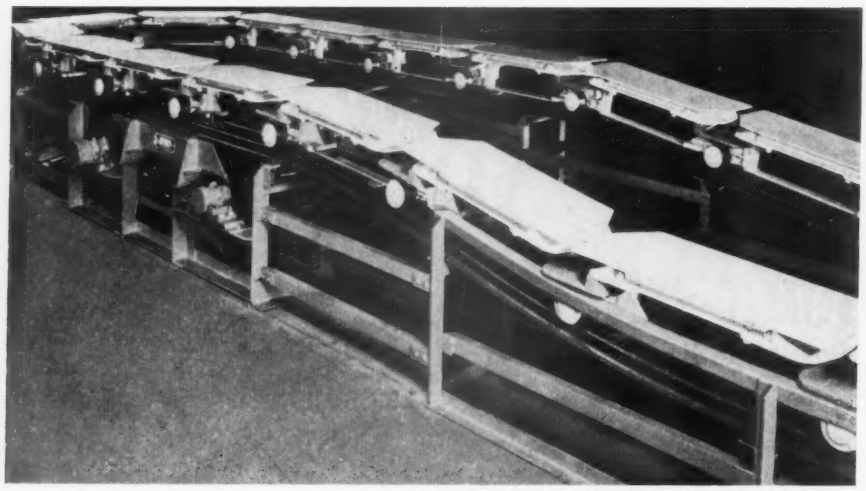
U. S. Patents No. 2,490,327 and No. 2,500,097

PITTSBURGH METALS PURIFYING COMPANY

World's Largest Manufacturer of Fluxes and Purifiers For All Metals and Alloys

1352 MARVISTA ST., N. S. PITTSBURGH 12, PA.

NEW EQUIPMENT AND SUPPLIES



Mold Conveyor: Jeffrey Mfg. Co., First Ave. and Fourth St., Columbus 16, O.—Mold conveyor features articulated connections between the cars and internal type takeups. Ball bearings are permanently lubricated and the bushings are oil impregnated. The cars are made up of a malleable iron chassis, chilled iron, flangeless wheels, and changeable tops. Tops can be either steel or cast iron, roller or hinged for automatic discharge. All moving parts below the car tops are protected from sand, shot or runouts by specially designed shields. Wheels cannot slide as they always are radial to the curves. A crawl-drive unit moves the conveyor at desired speeds with a smooth motion. Conveyor also can be operated intermittently by hydraulic drive.

For More Details Circle No. 1—Page 199

High-Purity Iron: Plastic Metals Division, National Radiator Co., Johnstown, Pa.—Technical data sheet PMS-24 gives typical analysis and prices of a 99.84 per cent pure electrolytic iron melting stock. Manufacturer recommends the iron for production and research projects in metallurgy and electronics. It is used also for the production of wire and plate where magnetic and electronic qualities are required, in vacuum melting processes for production of high-purity iron parts and as an additive to bring over-alloyed melts into control. Small sample is attached to data sheet.

For More Details Circle No. 2—Page 199

Drum Cleaning Machine: American Wheelabrator & Equipment Corp., Mishawaka, Ind.—Airless abrasive blasting machine cleans and reconditions 30 and 55-gal steel drums before painting and coating operations. It handles the type of drums used for holding foundry core binders, plastics, varnish, paint, grease, oil, gasoline, asphalt, chemicals or industrial process materials. The machine is capable of cleaning the exterior surfaces of closed-end drums and both the exterior and interior surfaces of open-end drums, together with the lids. Contaminants removed from the drum, plus the abrasive worn too small to be useful, are sorted out and the good abrasive is fed to the hurling wheel for reuse.

For More Details Circle No. 3—Page 199

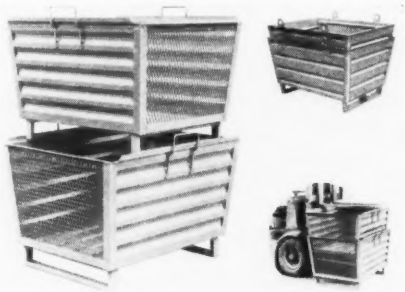
Swing Frame Grinder: Curtis Machine Corp., 1300 East Second St., Jamestown, N. Y.—Versatile swing frame grinder is made by an affiliate company in Germany for use in small and large plants for a variety of operations. It can be suspended and brought to heavy or bulky work. It can be rigidly mounted and used as a variety grinding and polishing unit. Design features include rugged construction, adjustable balance, high speed, maneuverability, positive and convenient tracking mechanism, and belt tensioning. It is driven by a 3-hp motor at 3400 rpm providing 7700 surface fpm.

For More Details Circle No. 4—Page 199

Hand Truck: Magline Inc., 1950 Mercer St., Pinconning, Mich. — Magnesium hand truck is rated to handle loads up to 450 lb. Truck weighs 16 lb when equipped with rubber-tired magnesium wheels or 20 lb when equipped with standard semipneumatic tires. It incorporates a shovel type nose unit and is designed for facility in moving bulky packages and irregularly shaped loads. It is completely assembled mechanically from component parts, with no welding employed. All parts are replaceable from stock.

For More Details Circle No. 5—Page 199

Nesting Stacking Box: Palmer-Shile Co., 16033 Fullerton, Detroit 27, Mich.—All-welded nesting stacking boxes, designed for heavy duty applications, nest one within another with a 6-in. clearance between box tops. Loaded boxes may be stacked by crane or fork truck by lifting, turning and tiering on the lower box. Made either with two corrugated sides and ends or both ends of expanded metal. Inside dimensions at the box top are 45 in. long and 36 in. wide. Depth is 23 in. Weight is about 190 lb with a capacity of 4000 lb.



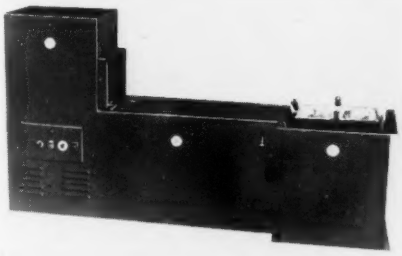
For More Details Circle No. 6—Page 199

Heat Treating Pots: Eclipse Fuel Engineering Co., Rockford, Ill.—Special impregnated metal coating on outside surface of pressed steel pots for heat treating reportedly makes possible 200 to 300 per cent longer life on some metal melting and heat treating operations. Coatings protect pot against heat oxidation and scaling at various temperature ranges up to 1850° F. Combination of formed steel construction and metallized coatings is said to reduce pot-hour costs,

provide faster heat-up, cut fuel costs, permit more uniform heating, guard against sudden pot failures and increase furnace productivity.

For More Details Circle No. 7—Page 199

Shell Mold Machine: Centrifugal Casting Co., P.O. Box 947, Tulsa, Okla.—Shell mold machine is said to maintain a production rate of 45



to 60 shells per hour. The shell molds are 12 x 18 in. Investing period and curing time are automatically controlled. Radiant oven is used to heat the pattern as well as cure the shells. In the dump box a breaker screen is provided to insure even distribution of the sand-resin mix regardless of the amount in the dump box. Hydraulic air system requires 80 psi for motivation.

For More Details Circle No. 8—Page 199

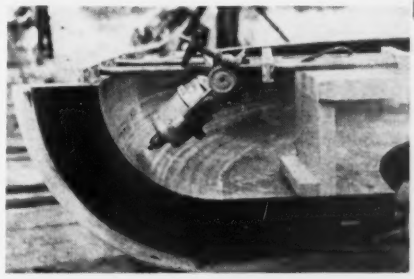
Warning Stripes: W. H. Brady Co., 727 West Glendale Ave., Milwaukee 12—Brilliant, diagonally striped self-sticking warning signals can be applied quickly to dangerous equipment and hazardous areas. Stripes are applied permanently to any clean, dry surface without moistening. Barricades, low or narrow areaways, elevator gates, pillars, electrical apparatus and trucks can be marked quickly. Stripes are stocked in 1, 1½, 2 and 3-in. widths. Yellow and black, black and white, and red and white color combinations are available. Acetate plastic is recommended for indoor applications, polyvinyl plastic for outdoor applications where dirt, grease, oil and solvents are prevalent. A reflective material is made for use wherever warning signals with brilliant reflection are necessary.

For More Details Circle No. 9—Page 199

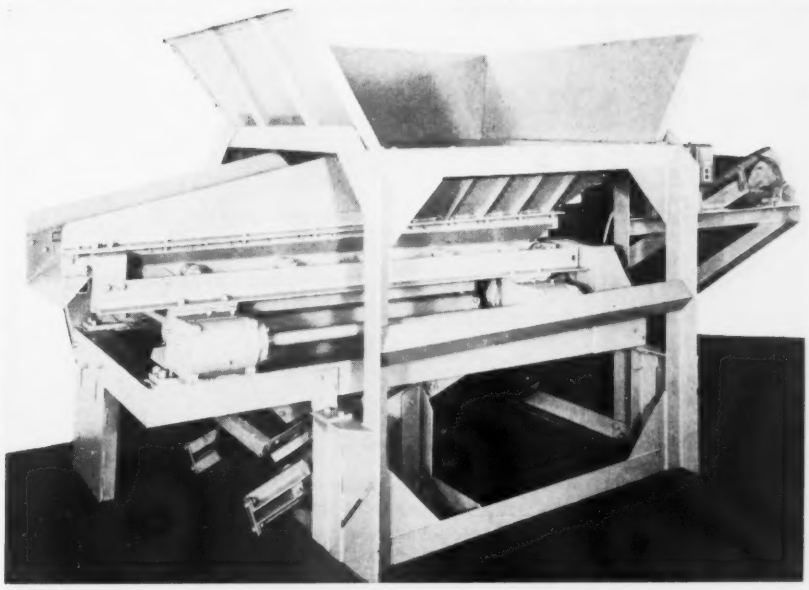
Limit Switch: Micro Switch, Division of Minneapolis-Honeywell Regulator Co., Freeport, Ill.—A two-circuit heavy-duty limit switch and a two-circuit basic switch have been added to the company's line. The heavy-duty limit switch combines precision, two-circuit switching with rugged construction. Snap action spring accomplishes simultaneous make and break of both contacts. Durable aluminum enclosure makes it useful as a control of two isolated circuits where switch is subjected to severe shock and impact. Switch is rated for 10 amp, 110, 220 or 440 v, ac and has a pilot duty rating of 6 amp, 125 v, ac. The two-circuit double-break basic switch is ½ x ½ x 1¼ in. and is suited for reversing circuit applications where space is at a premium.

For More Details Circle No. 10—Page 199

Corebox Machine: Castings Service Inc., 1006—11th Way South, P. O. Box 9115, Birmingham 5, Ala.—Portable corebox machine can produce half circular coreboxes from 9½ to 48 in. in diameter and any radius up to 15 ft. For straight coreboxes a straight edge is tacked or screwed to each side of the box for a guide. Radial coreboxes are



Shakeout Incorporates Magnetic Sand Cleaner



SHAKEOUT and sand cleaner, rigged for front end loader feeding of sand and castings from molding floor, discharges castings at one end and magnetically cleaned sand at other. Floor pits are eliminated as the unit and all related equipment can be kept above floor level, with receiving hopper low enough to be accessible to front end loaders. Castings are discharged high enough to load a sorting table or conveyor for spruing and sorting. Sand is discharged over a 15-in.-diam, magnetic pulley at a height suitable for loading a skip hoist bucket. Tramp iron can be loaded in a wheelbarrow or tote box.

Unit can be operated independently or with other equipment to become a complete sand conditioning system. The weight limit of castings is dependent upon type of loading equipment used, but dimensionally, castings are limited by the 14 x 24-in. discharge opening. Generally, castings scooped up with shakeout sand in a 12-cu-ft loader bucket can be handled satisfactorily. Designed as a unit for step-by-step mechanization of small and medium sized foundries, the unit is applicable, according to the manufacturers, to any foundry making small castings and handling sand with front end loaders.

The machine is manufactured by Rover Foundry & Machine Co., 158 Pringle St., Kingston, Pa.

For More Details Circle No. 11—Page 199

7 low-cost ways to weld steel castings

Weld with little or no preheat! Match physical, heat-treating, and impact properties! Save on cost of electrodes!

Use these **7**

P&H LOW HYDROGEN ELECTRODES

1. **70LB (E7016)** — Matches properties of Grade B and castings of similar analysis after heat treatment.
2. **P&H .25C (E7016)** — For castings repair where carbon is preferred to alloys for raising tensile strength. Lets you match both chemical analysis and heat-treating properties, a condition possible only with low-hydrogen coating.
3. **75LP (E8016)** — For 2% to 3% nickel steel castings. Charpy impact values of 20-35 ft. lbs. at −175° F.
4. **P&H .40C (E9015)** — For .40 carbon castings where you want to match both chemical and mechanical properties.
5. **AW2B (E9016)** — For repair welding of cast armor, "off analysis" and high-sulfur steels.
6. **P&H # 7 (E9016)** — Matches properties of Grade C and castings of similar analysis after heat treatment.
7. **90LH-2 (E10016)** — For high-tensile castings and alloy steels, such as SAE 8630, 4130, and comparable types, where the weld metal must match the heat-treating properties of the parent metal.

Get all the story on P&H Low-Hydrogen Electrodes. Write for Bulletin R-26.

P&H WELDING DIVISION
HARNISCHFEGER CORPORATION
4405 WEST NATIONAL AVENUE • MILWAUKEE 46, WIS.

the P&H *Line*

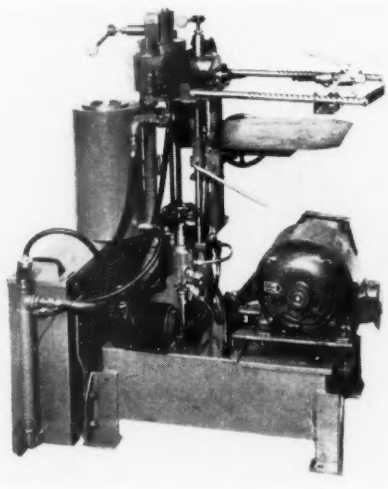
2502

guided from the center. Cuts can be made diametrically or radially. The machine weighs 29 lb on a frame made to receive a 1-hp router.
For More Details Circle No. 12—Page 199

Sand Mixer: National Engineering Co., Dept. F., Machinery Hall Bldg., Chicago 6, Ill.—Sand mixer with 1000-lb batch capacity features

integral liquid additions funnel and crib scraper, V-belt drive, lubrication access and spring loaded mullers for variable muller adjustments. The unit can be equipped with a bucket loader, double and air-operated discharge doors, dust and cooling hoods, aerator and automatic control equipment. The unit is said to offer increased sand capacity with a reduction in discharge time.
For More Details Circle No. 13—Page 199

Wax Injection Press: Alexander Saunders & Co., New York, N. Y. —Wax injection press for invest-



ment casting pattern reproduction has a pressure range to 1000 psi and capacity up to 138 cu in. per shot. The press uses a hydraulic pressure ram to force wax from a movable cylinder through an injection nozzle at controlled temperatures and pressures. Wax temperature is kept under separate thermostatic controls

(*Continued on page* 201)

HERE ARE QUICK REVIEWS OF NEW LITERATURE—available to foundrymen as "idea" and reference information. Reader in the United States and Canada may obtain copies by using the attached cards. Readers in foreign countries should write direct to the manufacturer offering literature.

81. Shell Molding Techniques

General Electric Co., Chemical Div., 1 Plastics Ave., Pittsfield, Mass.—28-page illustrated manual CDC-272 comprises an up-to-date practical handbook for the production of shell molds and castings. Detailed information is given on all details of the shell molding process, and trouble shooting hints, testing methods and procedures and other related problems are covered.

82. Foundry Wash Compounds

National Lead Co., Titanium Alloy Mfg. Div., 111 Broadway, New York 6, N. Y.—Three available 2-page data bulletins provide description, list of characteristics and methods of using TAM G-Z paste wash, Zircon utility mix and Zirconite paste wash. First is used as core and mold wash or as mudding compound; second is mix for ramming furnace linings or as lining wash, while third is core paste for patching or a core and mold wash when diluted.

83. Foundry Resins

Allied Chemical & Dye Corp., Barrett Div., 40 Rector St., New York, N. Y.—Series of six technical data reports presents information on Plaskon foundry resin R-146, bonding resin A-110, core binder resins 501-2, 522-11L, 580-11L, and 895-12. Use instructions, advantages, specifications and other data are included.

84. Ventilating Equipment

Chicago Blower Corp., 9867 Pacific Ave., Franklin Park, Ill. — Single-page illustrated data sheet provides brief descriptions of centrifugal, steel plate, axial airfoil and propeller fans, roof exhausters, ventilating sets and turbo-pressure blowers.

85. Joint Seal Compound

Whitehead Brothers Co., 324 W. 23rd St., New York 11, N. Y.—Uses of Whitehead's joint seal compound, as related in 4-page folder, include sealing dry sand molds, core vents, gaskets for pouring basins and runner boxes, and core prints for both dry and green sand molds. Other uses and product characteristics are presented.

86. Wire Rope, Slings, Assemblies

Macwhyte Co., 2940 Fourteenth Ave., Kenosha, Wis.—Series of three illustrated catalogs, identified as G-15, S-8 and 5201, presents data on preformed internally lubricated wire rope for all types of equipment, slings for moving and lifting materials and wire rope assemblies for machine parts, controls and operating devices.

87. Rocking Electric Furnace

Kuhlman Electric Co., Detroit Electric Furnace Div., Bay City, Mich.—28-page illustrated bulletin 473 contains extensive engineering, operational and application data on the Detroit rocking electric furnace for automatic melting. Brass, bronze, copper bearing metals, zinc, nickel, Monel, gray iron, white iron, stainless and special alloys can be melted. Detailed specifications are presented.

88. Grinding Wheels & Shapes

Cleveland Quarries Co., Sterling Grinding Wheel Div., Tiffin, O.—Prices for various available shapes of Stermount grinding wheels and shapes are found in 4-page illustrated folder. They are offered in vitrified and resinoid bonds with detachable spindles.

89. Ceramic Cores

American Lava Corp., Chattanooga 5, Tenn.—Alsimag bulletin 532 contains 4 illustrated pages on ceramic shock-resistant cores, troughs and gate tubes. Standard design and size ranges available are shown.

90. Refractories

Illinois Clay Products Co., Barber Bldg., Joliet, Ill.—Capsule information on a variety of refractories, silica and carbon bricks and insulation is contained in 2-page data sheet. Applications are indicated.

SUBSCRIBERS IN FOREIGN COUNTRIES—please note:

We regret that owing to postal and mechanical problems over which we have no control, we are able to process literature requests mailed in the *United States and Canada only* until further notice. We suggest that you write direct to the manufacturer for product information at the addresses given in advertisements and literature descriptions.

GOOD IN THE UNITED STATES AND CANADA ONLY

FOUNDRY
Penton Building, Cleveland 13, Ohio

Please send literature or detailed information on subjects circled at left to—

NAME TITLE

COMPANY

PRODUCTS MANUFACTURED

ADDRESS

CITY and STATE

Card MUST be completely filled out. Please TYPE or P

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170
171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190
191	192	193	194	195	196	197	198	199	200
201	202	203	204	205	206	207	208	209	210

FIRST CLASS
PERMIT No. 36
(Sec. 34.9 P.L.&R.)
Cleveland, Ohio

BUSINESS REPLY CARD
No Postage Stamp Necessary If Mailed in the United States

4c POSTAGE WILL BE PAID BY

FOUNDRY
Penton Building
Cleveland 13, Ohio

Readers' Service Dept.

91. Air Filter & Lubricator

Arrow Tools Inc., 1900 S. Kostner Ave., Chicago 23, Ill.—Application and operational data, advantages, flow information and installation details are presented for porous bronze filter and air line lubricator in 2-page data sheets F4-951 and L4-951. Both can be used with compressed air, gases, liquids.

92. Self-Dumping Hopper

Roura Iron Works Inc., 1401 Woodland Ave., Detroit 11, Mich.—Self-dumping hoppers available as standard in ½, ¾, 1, 1½ and 2-yard capacities are covered in 4-page illustrated catalog. Various models are adapted to handle wet or dry materials or hot materials. Stacking stands are among accessories listed. Hoppers can be handled by platform or fork lift trucks.

93. Sand Cost Survey

Hydro-Blast Corp., 2550 N. Western Ave., Chicago 47, Ill.—"Two-Minute Sand Cost Self-Survey" presents an easy and quick way of reaching a workable approximation of how soon a Hydro-Blast sand reclamation system will pay for itself. Accompanying data sheet states that reclaimed sand is better than new sand.

94. Vibratory Conveyors

Carrier Conveyor Corp., Frankfort Ave. at Clifton, Louisville 6, Ky.—12-page illustrated bulletin 111 describes features of a line of natural frequency vibratory conveyors. Units are available in either horizontal, inclined or vertical spiral types with a wide range of capacities. Balanced units are available for overhead installation. Selection material is given.

95. Portable Pyrometer

Illinois Testing Laboratories, Inc., 420 N. La Salle St., Chicago 10, Ill.—Alnor Pyro Lance portable pyrometer for nonferrous foundry work described and illustrated in 2-page data sheet 1724-D is available in several models and ranges up to 0 - 2500° F. Accessories and full specifications are shown. Wall-mounted model is also described.

96. Industrial Trucks

Buda Co., Harvey, Ill.—Illustrated bulletin 1654A contains 4 pages on line of various industrial trucks and attachments. Tractors are available with up to 12,000 lb drawbar pull. Other models are illustrated and complete specifications are given. Option of gasoline or diesel engines and wide variety of standard attachments are features.

97. Cut-Off Wheels

Raybestos-Manhattan, Inc., Manhattan Rubber Div., Passaic, N. J.—Cut-off wheels are subject of illustrated 4-page form and price supplement 6750. Aluminum oxide and silicon carbide grits are available. Wheel recommendations for a wide variety of materials and wet or dry machining are given, together with operating suggestions for improved cutting.

98. Welding Electrodes

Harnischfeger Corp., Milwaukee 46, Wis.—56-page pocket-size catalog 952 provides description, as well as such information as polarity, identification, tensile strength, elongation and available sizes and ratings, of P & H shielded arc welding electrodes. Mild steel, cast iron, alloy steel, stainless, low hydrogen and hard surfacing types are covered.

99. Melting Furnaces

Reda Pump Co., Furnace Div., Bartlesville, Okla.—Reflecting type melting furnaces for ferrous and nonferrous alloys described in 4-page illustrated catalog have typical daily melt records, refractory performances and fuel consumption shown. Design data are also given, along with capacities and other specifications.

IMPORTANT READING FOR FOUNDRYMEN

We have a limited quantity of the following reprints which we can furnish while they last.

100. Foundry Automation

"Automation in the Foundry" is title of article by Wm. E. Dougherty, consulting engineer at Giffels & Vallet Inc., which is available as FOUNDRY reprint. Article presents in question-and-answer form the consensus of progressive foundrymen on making foundries automatic. Where to start in modernizing present facilities and problems of automation are some factors covered.

101. Material Handling Problems

Reprint from FOUNDRY compiles in 54 well illustrated pages a series of feature articles by R. H. Herrmann, associate editor, on equipment and methods used in various foundry departments. Entitled "Methods and Equipment That Solve Material Handling Problems for the Foundry," booklet covers handling materials in the foundry yard, in metal charging, in the molding department, in the coreroom, in metal pouring, at the shakeout and in the cleaning department.

102. Trade Names

"Trade Names of Foundry Equipment, Supplies and Services" is directory compiled by FOUNDRY as service to foundrymen who want information concerning producers of machines, materials and services distributed under various trade names and trade-marks. Names and addresses of foundry suppliers, alphabetically listed, and a product where-to-buy listing are provided.

BUSINESS REPLY CARD

No Postage Stamp Necessary if Mailed in the United States

4c POSTAGE WILL BE PAID BY

FOUNDRY
Penton Building
Cleveland 13, Ohio

Readers' Service Dept.

FIRST CLASS
PERMIT No. 36
(Sec. 34.9 P.L.&R.)
Cleveland, Ohio

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170
171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190
191	192	193	194	195	196	197	198	199	200
201	202	203	204	205	206	207	208	209	210

GOOD IN THE UNITED STATES AND CANADA ONLY

FOUNDRY
Penton Building, Cleveland 13, Ohio

8-54

Please send literature or detailed information on subjects circled at left to—

NAME TITLE

COMPANY

PRODUCTS MANUFACTURED

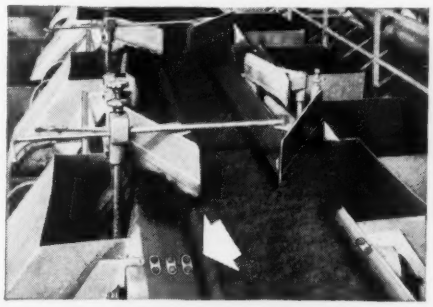
ADDRESS

CITY and STATE

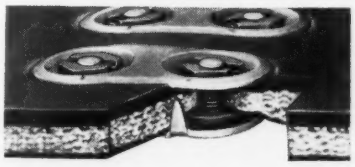
Card MUST be completely filled out. Please TYPE or PRINT

NEW!
Developed Especially for FOUNDRIES

FLEXCO SCRAPER PLATES



FOR JOINING CONVEYOR BELTS WHERE SCRAPERS AND PLOWS ARE USED



- Especially designed for use in joining foundry conveyor belts.
- Beveled top plates ride snug to belt eliminating interference with plowing and scraping operations.
- Thoroughly tested . . . by several large foundries . . . for four years.
- One size . . . for joining belts 5/16" to 1/2" thick with not more than 500 ft. centers.
- Available in Steel, Monel and Everdur.

Ask for Bulletin F-108
Order From Your Supply House

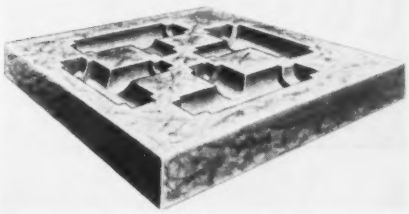
FLEXIBLE STEEL LACING CO.
4667 Lexington St., Chicago 44, Ill.

(Continued from page 198)

at the nozzle, in the pressure cylinder, and in the reserve cylinder holding tank. The press is equipped with a die holding table and die positioning clamp. The unit is manufactured by Sherwood Metal Products Co., Union, N. J., and marketed by Saunders.

For More Details Circle No. 14—Page 199

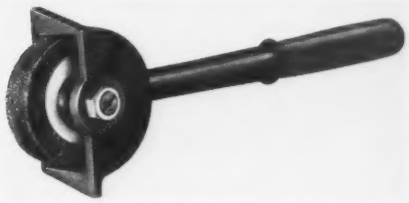
Sand Core Driers: Fiberite Corp., Winona, Minn. — Reinforced phenolic, fiber-glass high impact thermosetting plastic material has been



developed for making duplicate sand core driers. After the first drier has been cast or machined from metal, each duplicate can be made quickly and accurately from the new material by low pressure molding presses. The material will withstand temperatures up to 500° F, yet will form under low pressure and low temperature. In its forming stage, it flows at 320° F under 300 psi pressure. Aging and hardening of driers requires a 6-hr after-bake at 300° F.

For More Details Circle No. 15—Page 199

Wheel Dresser: Desmond-Stephan Mfg. Co., Urbana, O.—Grinding wheel dresser employs a 3-in. abrasive wheel with a 1-in. face,



mounted in a heavy metal housing and held securely by lock nuts. In dressing the grinding wheel the dresser is brought into contact with the wheel at a 15 degree angle to restore the accuracy and cutting action of the wheel. The dresser employs its own lubrication system, using a wick which discharges oil while the cutting wheel is in motion. Replacement wheels are available.

For More Details Circle No. 16—Page 199

Air Line Filter: Airlenco Inc., 198 Wayne St., Mansfield, O.—Filter reportedly prevents pressure drop in air lines as well as removing moisture and oil. The filter, when installed in an intermediate position or at the end of an extended line with a check valve, is said to provide an adequate air supply in spots previously af-

7 things to remember about BLASTRITE SHOT AND GRIT

QUALITY
EFFICIENCY
ECONOMY
LONG WEAR
CAREFUL SCREENING
PROPER ALLOYING
LABORATORY CONTROL

AVAILABLE IN ALL SIZES

Ask for our new catalog No. AB-53

ABRASIVE SHOT & GRIT CO., INC.
SPRINGVILLE, N. Y.
Telephone Springville 1

STANDARD HAS ENGINEERED AND BUILT FOUNDRY CONVEYORS SINCE 1906

Standard Conveyor Company has an experience record of almost a half century — engineering and building foundry conveyors. On any foundry handling problem Standard can aid you to select and install conveyors that will give you reduced handling time — uninterrupted smooth flow in production — careful safe handling of light or heavy molds — better storage facilities — and help conserve and better utilize existing foundry space.

Available in a wide range of sizes, weights and types — equipped with shielded bearings expressly designed for severe foundry service — to suit a wide variety of foundry applications. Whatever your specific need, Standard is qualified by experience and facilities to recommend and furnish the right type of conveyors.

Send for Standard's special catalog "Conveyors for Foundries" — a valuable reference book illustrating and describing conveyor installations in leading foundries.

STANDARD CONVEYOR COMPANY

General Offices: North St. Paul 9, Minn.

Sales and Service in Principal Cities

Engineered Conveyor Systems — Portable Conveyor Units — Spiral Chutes — Pneumatic Tube Systems

ENGINEERED FOR LOW-COST PRODUCTION

fected by a pressure drop. The filter cylinder is constructed of ¼-in. steel with ¼-in. plates welded at each end and has been tested to withstand a hydrostatic pressure of 600 psi. The unit is 12 in. in diam and 36 in. long.

For More Details Circle No. 17—Page 199

Protected Motors: Electric Machinery Mfg. Co., Minneapolis 13—Protection against moisture and corrosion is provided in line of weather-protected squirrel-cage induction motors featuring silicone insulation on the motor winding, silicone enamel baked on all exposed metal parts, and stainless steel in parts subject to any abrasion. The silicone is said to have excellent heat resistance, repels water, is inert to corrosion from most air-borne chemical fumes, resists oxidation and sunlight and is a good electrical insulator. Mechanical construction minimizes entrance of air-borne dirt and particles. Motors are rated at 250 hp and larger.

For More Details Circle No. 18—Page 199

Solenoid Valve: Hays Mfg. Co., 814 West 12th St., Erie, Pa.—Piston-type, pilot action solenoid operated valve provides "on and off" control

of air or water flow. Pilot action provides large flow capacity and has "anti-water hammer" feature. Valve is built of noncorrosive parts and is packless in construction. Available in ⅜, ¾ and 1¼-in. pipe sizes.

For More Details Circle No. 19—Page 199

Storage Batteries: General Communications Inc., 1420 East 25th St., Cleveland—Long-life storage batteries assertedly will stand up for long periods of severe operating conditions in gas-powered industrial trucks where requirements call for extreme ruggedness and optimum reserve power. Extra heavy plates provide resistance to physical shock, together with a low gravity electrolyte that

(*Continued on page* 204)

Metals for

Industrial Machinery

GLC GRAPHITE ELECTRODES help make the metals required for the manufacture of industrial equipment, large and small.

The performance of GLC GRAPHITE ELECTRODES is unsurpassed in the processing of electric steels, foundry castings, ferroalloys and magnesium. Our facilities have been greatly expanded to keep pace with the growing emphasis on electric furnace steel production.

ELECTRODE DIVISION

Great Lakes Carbon Corporation

Niagara Falls, N.Y. GLC Morganton, N. C.

Graphite Electrodes, Anodes, Molds and Specialties

Sales office: Niagara Falls, N.Y. **Other offices:** New York, N.Y., Oak Park, Ill., Pittsburgh, Pa.

Sales Agents: J. B. Hayes, Birmingham, Ala.; George O'Hara, Long Beach, Cal.; Great Northern Carbon & Chemical Co., Ltd., Montreal, Canada

Overseas Carbon & Coke Company, Inc., Geneva, Switzerland; Great Eastern Carbon & Chemical Co., Inc., Chiyoda-Ku, Tokyo

(*Continued from page* 202)
insures long life. The batteries are designed specifically for service on fork lifts, cranes, straddle trucks, towing tractors and similar material handling equipment. It is said the batteries are highly resistant to plate shredding, grid disintegration and separator failure.

For More Details Circle No. 20—Page 199

Foundry Boards: Federal Foundry Supply Co., 4600 East 71st St., Cleveland 5, O.—Squeeze, bottom, and pattern boards are surfaced with processed resinwood, claimed to be 30 per cent harder than rock maple, and manufactured by a special process to withstand intense heat and pressure. Both sides are usable and it is said that 2900°F molten metal leaves only a minor surface scar. Cleats also are surfaced with the processed resinwood to assure extra long life. The boards are manufactured in 84 standard stock sizes by the Rock Island Millwork Co., Resinwood Division, Rock Island, Ill.

For More Details Circle No. 21—Page 199

Polishing Machine: Stephen Bader & Co., Rockville Center, N. Y. —Belt polishing machine has contact wheel, idler wheel and drive motor all mounted on a single base to simplify installation, eliminate tracking problems and reduce the need for adjustment during operation. Working area freedom permits the polishing of awkward and irregular work pieces. A standard 132-in. belt length with a variety of contact wheel sizes is used. Wheels from 4 to 18 in. in diam can be used on the machine without changing surface speeds or belt size, according to the manufacturer. It is claimed that the belt direction can be reversed at full speed without danger of the belt slipping off the wheels. Contact wheels are integrally mounted on spindles which fit into a taper lock.

For More Details Circle No. 22—Page 199

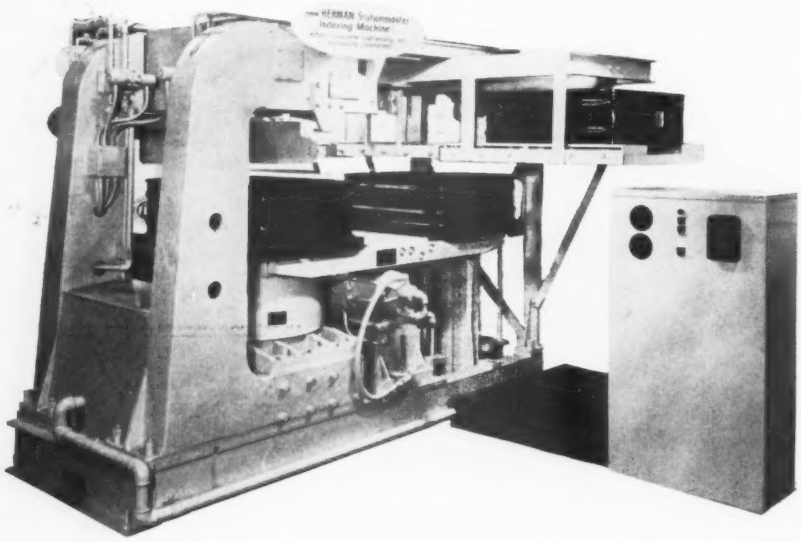
Side Shields: Watchemoket Optical Co., 232 West Exchange St., Providence, R. I.—Clip-on side shields add deep cup side protection to safety spectacles of any size or shape. Molded of clear or green acetate, they are easy to attach and remove by positive, nickel-silver clip holders. Can be attached to prescription safety spectacles for wear in the shop or removed when glasses are worn outside the shop.

For More Details Circle No. 23—Page 199

Reciprocating Conveyor: Hydro-Blast Corp., 2550 North Western Ave., Chicago 47, Ill.—Reciprocating conveyor is designed to feed a constant volume of any dry or moist material from an overhead bin. Operation is said not to be affected by lumps or variations in the consistency of the material. The device is operated by plant air and the only

(*Continued on page* 206)

Two-Station Machine Jolts, Squeezes, Strips



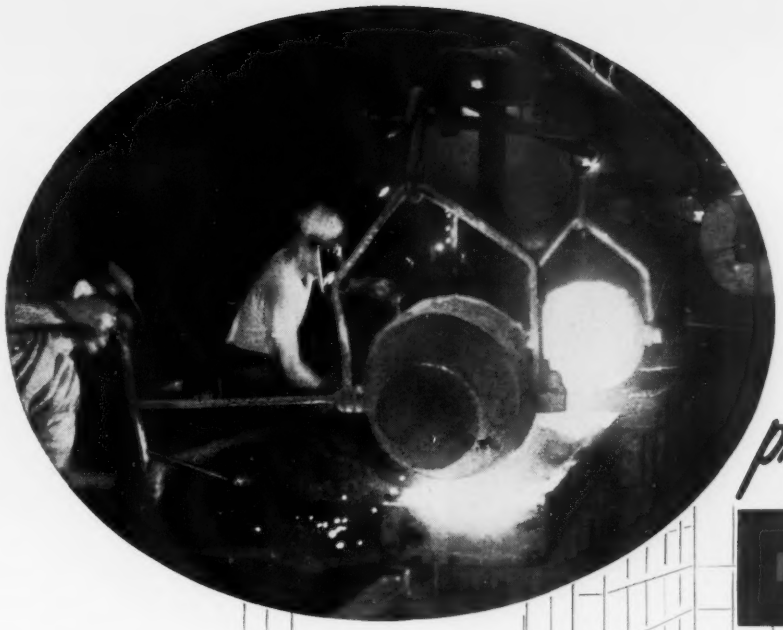
TWO station, indexing type jolt squeeze strip molding machine is designed to distribute molding operations between two stations operating simultaneously.

Empty flasks are positioned above pattern stripping station as finished mold is ejected on discharge conveyor. Flask then is lowered onto stripping pins which lower it onto pattern attached to carrier plate. Index turret elevates and rotates carrier plate 180 degrees. Plates are lowered onto a rest above stripping mechanism and onto the jolt or squeeze table plate. As empty flask is placed on jolt machine it is filled with sand and jolted. Jolting operation may occur during or subsequent to filling.

Adjustable strike-off bar lowers to predetermined level, squeeze head swings into position over flask, striking off sand in flask. Squeeze piston elevates rammed flask against squeeze head and retracts. Squeeze head is swung out and strike-off bar is elevated to clear next flask being indexed into position over jolt machine.

When carrier plate lowers at stripping station, the strip mechanism elevates, stripping the mold from pattern. Retractable discharge conveyor located directly above strip mechanism rotates in, contacts flask and raises it from stripping pins. Mold is then discharged onto runout conveyor. Cycle then repeats. Controls may be automatic, semiautomatic or manual. Machine is manufactured by Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.

For More Details Circle No. 24—Page 199



Another cast product made better with

NEVILLE PIG IRON . . .

The Richmond "Breslin" Recessed Bathtub

GRAY iron castings for modern bathtubs must meet many unique and rigid requirements. The Richmond Radiator Company, for example, demands pig iron that will cast with a high degree of fluidity to produce large, clean castings approximately 7/32" thick. The castings must be sound and free of porosity to resist the thermal shock of the enameling process in which the temperature of the casting is elevated from room temperature to 1700°F. And to assure a constant matching of the coefficient of expansion between the enamel and the casting, *uniform* pig iron quality is a "must."

To meet these rigid requirements, the Monaca and Uniontown, Pa. foundries of Richmond Radiator regularly specify Neville Pig Iron for their gray iron production. ● Let Neville help you solve *your* special casting problems.

Neville Pig Iron and Neville Coke for the Foundry Trade

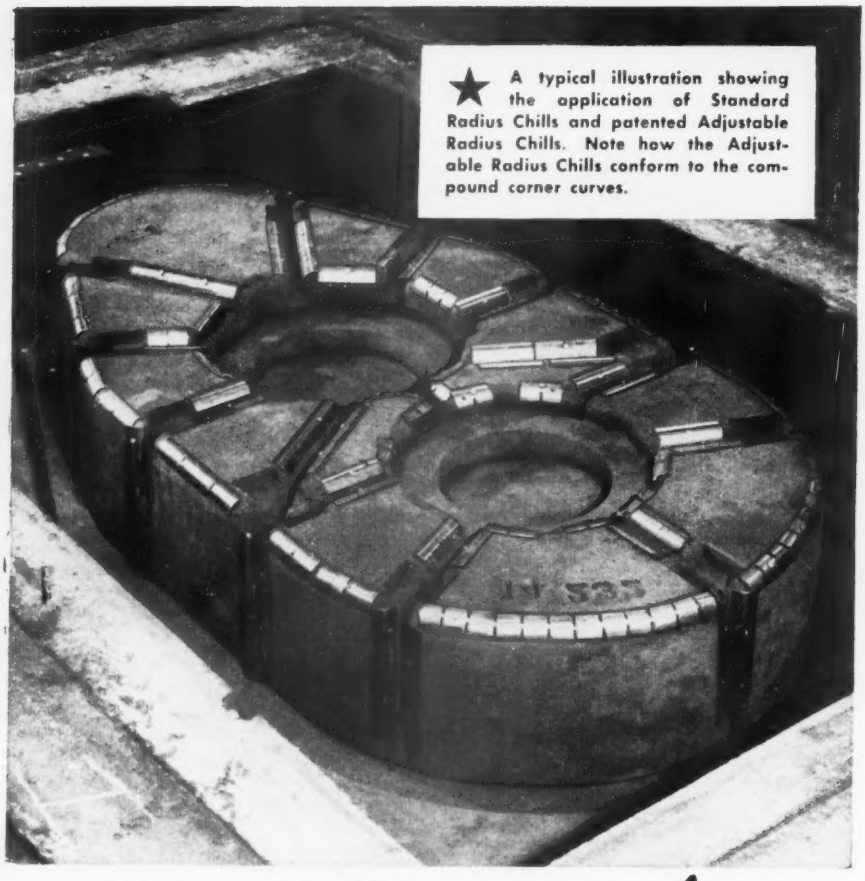
PIG IRON DIVISION

PITTSBURGH COKE & CHEMICAL CO.

Grant Building • Pittsburgh 19, Pa.

W&D 5281

COAL CHEMICALS • AGRICULTURAL CHEMICALS • FINE CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON



★ A typical illustration showing the application of Standard Radius Chills and patented Adjustable Radius Chills. Note how the Adjustable Radius Chills conform to the compound corner curves.

ASK FOR

Milwaukee

RADIUS

CHILLS

Straight Section or Adjustable

Milwaukee straight section Radius Chills have been used to considerable advantage on straight fillets and edges in many leading steel foundries. The new patented Adjustable Radius Chills, with equally spaced slots so that sections may be cut off in one inch segments, fulfill the need where chills are necessary along the fillets of cylindrical, round, or irregularly shaped castings. These Adjustable Chills have effected substantial savings in welding and cleaning costs.

WRITE FOR SAMPLES AND PRICES

Milwaukee Chaplet & Mfg. Co.

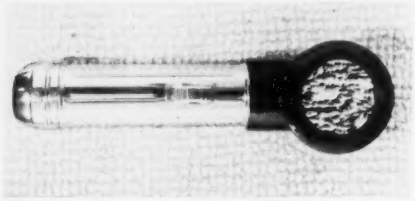
1025 SOUTH 40th STREET • MILWAUKEE 4, WISCONSIN

(*Continued from page* 204)

electric power required is to operate a solenoid air valve. Units of various capacities are available and each conveyor is adjustable from maximum capacity to zero.

For More Details Circle No. 25—Page 199

Inspection Light: Abbeon Supply Co., 179-25 Jamaica Ave., Jamaica 32, N. Y.—Inspection light combines a 7-power magnifying



glass with a light built into the handle to illuminate the magnified field of vision. The unit is about 1 in. longer than a standard two-cell flashlight, and the lenses are housed in a plastic case made so that the eye of the user can be placed directly over the work being inspected. Regular flashlight dry cell batteries are used for power. Magnifications of 5, 20 and 40-power also can be supplied.

For More Details Circle No. 26—Page 199

Grinding Wheel: Norton Co., Worcester 6, Mass.—Vitrified grinding wheel is designed for rough grinding cast iron at speeds up to 6500

sfm. Manufacturer claims that less dressing is required to keep wheel sharp, the corners hold up longer without rounding, wheels consistently can be duplicated from wheel to wheel and lot to lot, and operator fatigue is lessened. The wheels can be made in all sizes, shapes, grit, sizes and grades used on floor stand, bench stand, swing frame and portable grinders of the slow speed type for snagging gray and hard malleable iron castings.

For More Details Circle No. 27—Page 199

Left Hand Band Saw: Moak Machine & Tool Co., Port Huron, Mich.—High-speed sawing of wood, plastics, light metals and paper is

now possible on a left-hand 36-in. high-speed band saw. The construction is the same as the company's right hand model, with one exception—the left hand band saw is of heavy steel welded construction while the frame of the right hand model is cast of high-strength gray iron. Both models have two-wheel equalized brakes, 40-in. table height and conveniently located operating controls. Belt drive, belted motor or direct motor drive is optional.

For More Details Circle No. 28—Page 199

Air Circulator: American Cool-air Corp., Jacksonville, Fla.—Industrial air circulator and exhaust fan is portable and can be carried from

place to place to cool men working in hot spots. It can be mounted on a post or on the ceiling to cool production lines or a warehouse bay. Available with or without stand and guards, the unit can be mounted in a wall or window to exhaust smoke or fumes.

For More Details Circle No. 29—Page 199

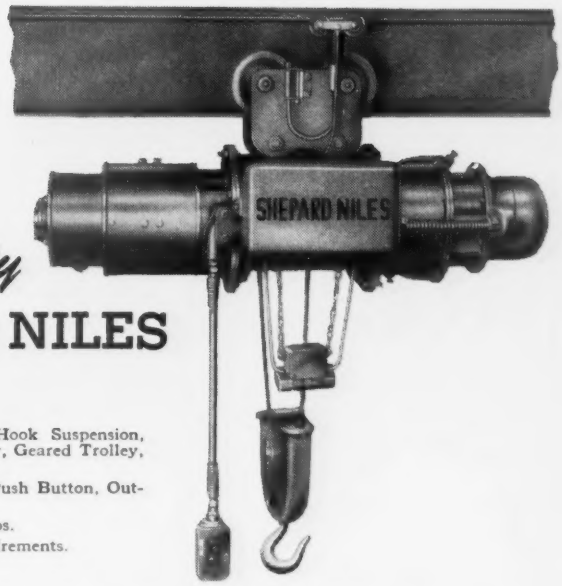
Speed Reducers: W. A. Jones Foundry & Machine Co., 4401 Roosevelt Rd., Chicago 24, Ill.—Company has expanded its line of herringbone speed reducers to include standard size drives and ratios from 1 to 1950 hp. Reducers are produced in 60 standard ratios ranging from 1.27:1 up to 335.8:1. All units are avialable in types suitable for either coupled or overhung load applications. Nine standard shaft extension assemblies and two standard styles of bed plates also are available.

For More Details Circle No. 30—Page 199

Kiln Type Ovens: Michigan Oven Co., 415 Brainard, Detroit, Mich.—Company is offering a new line of standard kiln type ovens for baking, heating, drying and curing. Ovens are available in six sizes, with work space ranging from 4 x 6 x 4-ft deep to 6 x 6 x 7-ft deep, operating on either gas or electricity.

For More Details Circle No. 31—Page 199

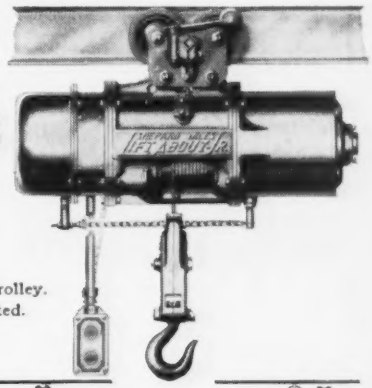
Choose the hoist *that* fits the job!



Heavy Duty
SHEPARD NILES Hoist

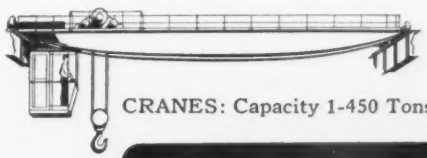
Types: Lug Suspension, Hook Suspension, Base Type, Push Trolley, Geared Trolley, Motor-driven Trolley.
Controls: Pendant Rope, Push Button, Outrig, Remote.
Capacities: 500 to 40,000 lbs.
Speeds: To meet your requirements.

IT PAYS to choose the right hoist for your lifting job . . . the wrong choice can be costly! Let a Shepard Niles representative guide you in selecting the hoist that best suits your needs. He's a specialist in through-the-air handling . . . knows which model, capacity and controls will be right for your use.

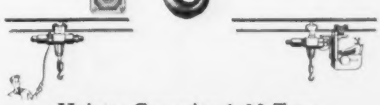


Light Service
SHEPARD NILES
LIFT ABOUT-JR.

Types: Lug Suspension, Hook Suspension, Push Trolley.
Controls: Single Speed, Push Button, Rope Operated.
Capacities: 250, 500, 1000, 2000 lbs.



CRANES: Capacity 1-450 Tons



Hoists: Capacity 1-20 Tons

SHEPARD NILES
CRANE AND HOIST CORPORATION

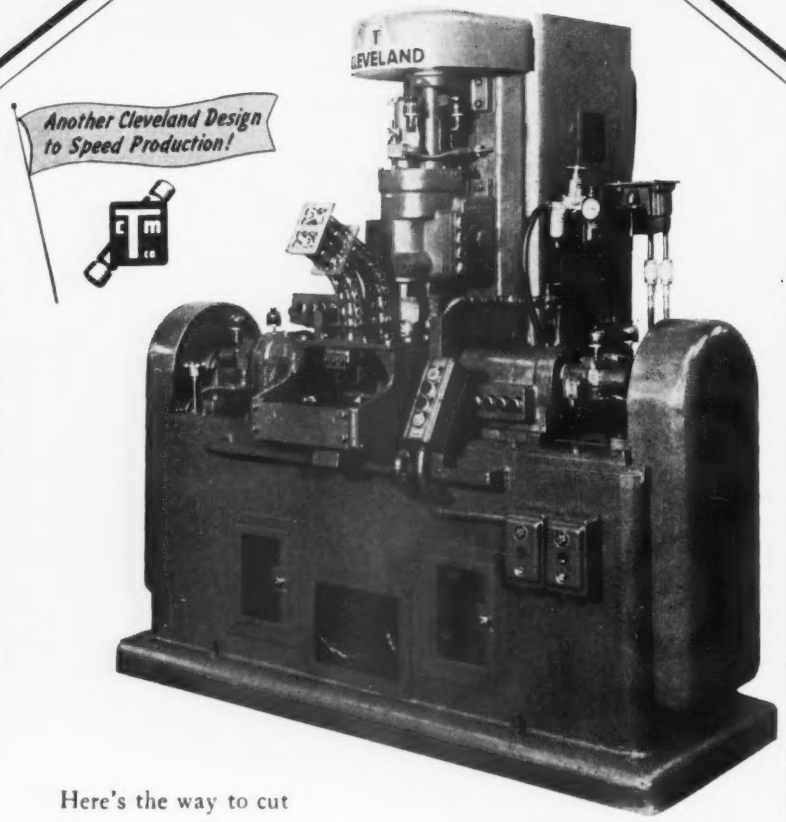
SHEPARD NILES Crane and Hoist Corp.
1348 Schuyler Ave., Montour Falls, N.Y.

( ) *Please send me your new Lift About-Jr. Bulletin.*
( ) *Please send me your Shepard Niles Hoist Bulletin.*
( ) *Have a Shepard Niles representative call on me.*

SEND FOR BULLETINS!

NAME _____ TITLE _____
COMPANY _____
STREET _____
CITY _____ STATE _____

1308 tee fittings per hour!



Here's the way to cut costs on tee fittings! This Model FT-1 will tap 1308 pieces ½" - 14 per hour at 100% efficiency. Also handles ¾" and 1" sizes. All spindles have their own lead screw feed—assuring the precision for which Cleveland Fitting Machines are famous. Produced parts are square and within the required tolerances. Set-up and change-over time is reduced and tap life increased up to 25%. For greater efficiency this Model may be grouped in batteries of three with one operator to each battery.

If you make fittings of any size or type it will pay you to consult Cleveland engineers. Their know-how can save you money.

Write today for Catalog No. **FD-84.**

THE CLEVELAND TAPPING MACHINE CO.

A Subsidiary of AUTOMATIC STEEL PRODUCTS, INC.

CANTON 6, OHIO

For Better Tapping - - Faster!

CLEVELAND lead **fittings machines** screw

Induction Melting

(*Continued from page* 87)

that chlorination of the master heat caused the difference in microstructure between the control casting and the casting produced by induction melting since remelting to cast the induction melted specimens might have eliminated the effect of the chlorination. Tullis[1] has shown that an 11 per cent silicon alloy can be modified to a considerable extent by passing chlorine through the melt. Therefore, a melt was made in a gas furnace using the master heat metal (No. 356 alloy) and chlorination was omitted. The structure of the resulting casting was found to be identical with that of the control casting. So it was apparent that the chlorination was not responsible for the structure obtained with the control specimen.

Angular Plates Suppressed

The structure of the control casting shown in Fig. 1, however, is characteristic of a modified alloy in that the occurrence of large angular silicon plates has been suppressed. The structure of the induction melted metal shows a tendency toward normal structure with increasing power frequency. Archer and Kempf[2] have explained the phenomenon of modification of aluminum-silicon alloys as being related to the presence of vast numbers of particles of colloidal size. These are pictured as mechanically obstructing the growth of the silicon crystals.

Mascre[3] has related the modified structures to the viscosity of the liquid aluminum - silicon solution. When the viscosity of the liquid is high, as caused by the addition of sodium, the deposition of new atoms on the silicon crystal is retarded. This is believed to favor the development of many rounded silicon crystals rather than to permit the normal growth of the large angular silicon plates.

The most probable reason for the modified structure obtained with the control castings may be related to residual sodium in the ingot metal. Aluminum pig obtained from the reduction cells is known to contain small quantities of sodium derived from the electrolyte. Aluminum-silicon alloys produced from this pig tend to develop a modified structure. Remelting should result in some loss of the sodium with a diminished tendency toward modification. It has been noted, however, that the effect of this sodium is more stable than is the case when modification is effected through metallic sodium additions.

(*Concluded on page* 210)

IS IT WORTH THE TIME AND TROUBLE TO "ROLL YOUR OWN"?

YOU CAN MAKE a mix to line your ladles and furnaces, and get passable results. But can you really prove that "rolling your own" beats the economy, convenience and sure performance of a custom-made refractory? Troubles like scrap loss, furnace repairs and poor metal always cost more than sensible precaution. That's why more and more malleable iron ladles, acid electric furnaces and ladles handling electric furnace steel are lined with

IRONTON CARO-LINE

a custom-made refractory for malleable shops and electric steel foundries. All you do is add water and use . . . nothing simpler for your men. Line anything from a small hand ladle to a large electric furnace with *IRONTON* CARO-LINE.

CHECK UP on your material costs, labor costs, and grief from poor refractory mixes . . . and see if it wouldn't cost less to use *IRONTON* CARO-LINE. Foundrymen from Massachusetts to Oregon and Texas to Montreal are happier with CARO-LINE. Order a get-acquainted shipment today.

MONEY-SAVERS for FOUNDRIES

***IRONTON* BERLITE**
Special purpose Super-duty refractory lining material.

***IRONTON* NOJOINT**
High Duty plastic for furnace linings and all-around foundry use.

***IRONTON* RAVENITE**
New black plastic with "non-wetting" feature, for ladles, cupola, etc.

***IRONTON* CARO-LINE**
Siliceous lining for acid electric furnaces, bessemers, and ladles.

***IRONTON* DE-RITE**
Super Duty plastic for extra slag resistance in hard service.

***IRONTON* SPECIALTIES FOR CUPOLA OPERATION**
Slag hole blocks, tap holes, cupola spout brick, etc.

GRANULAR LADLE COVER
The new "shovel on" top insulation for holding heat in all ladles.

***IRONTON* FIRE BRICK**
A best buy in any grade; made from Kentucky flint and semi-flint clays.

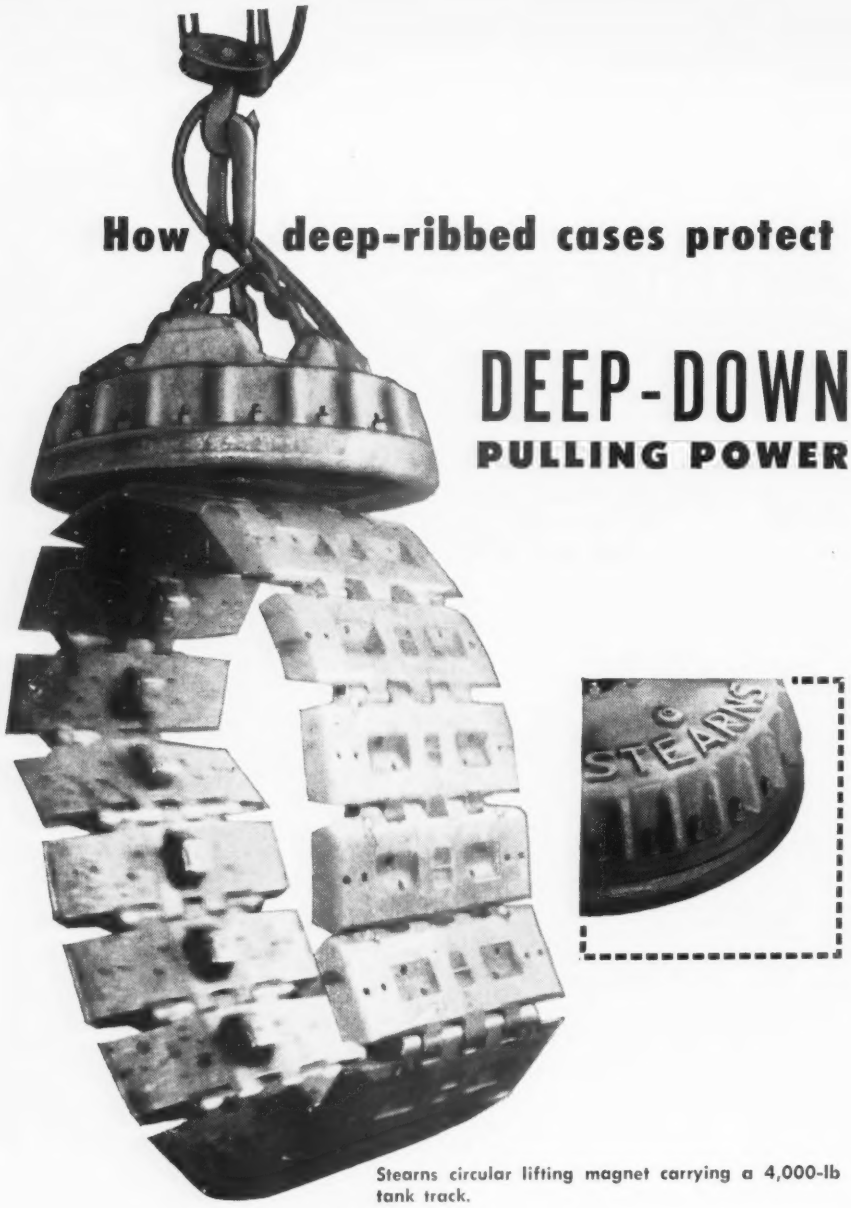
Want the Ironton office direct? Phone Ironton 109, or 110

THE IRONTON FIRE BRICK COMPANY
IRONTON, OHIO

RELIABLE REFRACTORIES

Representatives reached by phone in these cities:

BALTIMORE, Md. MUlberry 7184
BOSTON, Mass. HAncock 6-1210
BUFFALO, N. Y. TAylor 2091
CHATTANOOGA, Tenn. Phone 7-6497
CHICAGO, Ill. EUclid 3-3770
CLEVELAND, O. Cherry 1-6711
CLEVELAND, O. VUlcan 3-8200
DETROIT, Mich. WOodward 3-8123
HARTFORD, Conn. Phone 32-6941
JACKSONVILLE, Fla. Phone 3-5586
KENTWOOD, La. Phone 2191
MIAMI, Fla. Phone 82-8782
MILWAUKEE, Wis. BRoadway 6-4790
PHILADELPHIA, Pa. JEfferson 5-1012
ST. PAUL, Minn. EMerson 6312
SEATTLE, Wash. MAin 4330
SILVER SPRING, Md. JUniper 7-5460
SPOKANE, Wash. MAin 1444



How deep-ribbed cases protect

DEEP-DOWN
PULLING POWER

Stearns circular lifting magnet carrying a 4,000-lb tank track.

The cooler the magnet, the better its lifting efficiency. That's why powerful, deep-field Stearns lifting magnets are designed for maximum heat dissipation. In both the welded and bolted units, the heavily ribbed magnet case provides greater radiation area, for cooler and more efficient operation.

This design also provides greater protection against internal and external damage in the event of rough handling. These are important reasons why you can operate Stearns magnets profitably on steady, long-shift duty.

In addition to fast heat dissipation, Stearns magnets offer the following advantages:

- Permanently sealed magnet coil not disturbed when servicing terminals or pole shoes.
- Leads and terminals fully protected against abrasion and shock.
- Vacuum-impregnated windings assure long life, and dependable operation.
- Waterproof construction.

Stearns lifting magnets — both circular and rectangular are available in a wide range of standard sizes. Custom-built models on request. See your Stearns representative or write for Bulletin 35-B-2.

1093

MAGNETIC EQUIPMENT FOR ALL INDUSTRY

STEARNS MAGNETS

STEARNS MAGNETIC, INC., 662 S. 28th St., Milwaukee 46, Wis.

(*Concluded from page* 208)

These latter alloys lose almost all of their modifying tendency after a single remelt.

In view of the preceding theories, it is suggested that the type of agitation received by the metal in induction melting has an influence on whether a modified or unmodified structure is found when the metal has solidified. With low frequencies, the agitation is such as to prevent settling or separation of any fine particles which may act as obstructing particles in the manner explained by Archer and Kempf. These particles, if colloidal in size, would also remain in suspension without agitation. However, if the particles remain in suspension, no essential difference is introduced by the gross churning action as in 960-cycle induction melting vs gas-fired furnace melting. This would explain the fact that modification is obtained at low frequencies similar to non-agitated melting that takes place in a gas-fired furnace.

However, with higher frequency induction melting, the agitation is no longer gross; it is apparently of very small amplitude and high frequency. This type of agitation is effective in obtaining settling in a liquid medium containing dispersed particles. The fact that an unmodified structure results from metal melted at this frequency would also fit Archer and Kempf's theory in that the unmodified structure is associated with a lack of these particles.

Conclusions—

1. The stirring action associated with induction melting of aluminum alloys does not, in itself, impair the properties of the cast metal.

2. Induction melting of aluminum-silicon alloys promotes the development of a normal structure in the metal.

3. Higher melting frequencies (20 kc) are more effective than lower frequencies (0.96 kc) in developing the normal structure.

4. Although the eutectic is considered to be present in an unfavavorable form, moderately improved mechanical properties are obtainable with induction melted No. 356 alloy in the T6 condition.

Acknowledgement — The authors are indebted to the Department of the Army for permission to publish this report. The opinions expressed in the paper are those of the authors and are not necessarily endorsed by the Department of the Army.

References

1. Tullis, D. R., *Journal* Inst. Metals (1927) 38, p. 186
2. Archer, R. S. and Kempf, *Trans.* AIME (1926) 73, p. 581
3. Mascre, C., *Foundry Trade Journal*, (25 June 1953), p. 725

Powder-Cutting Saves $2,000

This 3-ton, 13-in. thick manganese-bronze flywheel casting was reduced to furnace-charging size by powder-cutting in less than 8 hours. Previous methods required over 16 hr. to cut up a casting only 4-in. thick. Powder-cutting proved to be the most economical method for this job.

Powder-cutting replaced cold-sawing in this foundry operation, and did three times the cutting in half the time.

LINDE engineers were called in to help solve the problem of reducing giant flywheel castings to furnace-charging size. The castings had been part of an experimental program to develop accurately balanced flywheels for diesel engines. Test castings had to be cut for remelting. . . . But because of their great size, scrapping by formerly used methods would have been costly—if possible at all. LINDE advised powder-cutting.

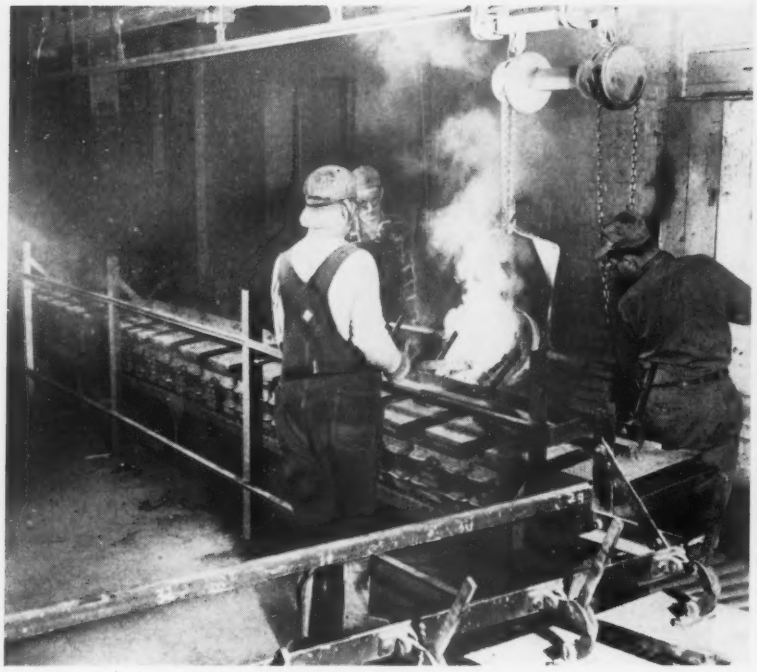
In powder-cutting, a powdered metal is added to the oxygen stream to raise the temperature of the cutting flame, and increase the speed of the severing action. Among other things foundries are using powder-cutting to remove gates and risers from stainless steel castings, to wash away sand-incrusted casting surfaces, and for gouging out defects prior to repair welding.

LINDE service engineers will be glad to help you determine the best powder-cutting setups or other uses of the oxy-acetylene process for your needs.

LINDE AIR PRODUCTS COMPANY
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
Offices in Other Principal Cities
In Canada: DOMINION OXYGEN COMPANY
Division of Union Carbide Canada Limited

Linde
Trade-Mark

"Linde" is a registered trade-mark of Union Carbide and Carbon Corporation.



Pouring is done on conveyor connected to molding machines and shakeout. Top clamp holds mold in place during pouring

Three men produce 750-850 completed molds daily. Before, each produced 200

MECHANIZING A SMALL FOUNDRY

Raises Production Efficiency

By DELMAR JOHNSON
Vice President
Indiana Brass Co.
Frankfort, Ind.

A RELATIVELY simple, yet extremely effective production line for turning out high quality precision brass castings has provided Indiana Brass Co., Frankfort, Ind., with substantial savings both in dollars and in man-hours since its installation a year ago.

The heart of the system is two molding machines made by the Osborn Mfg. Co., Cleveland, which have a simultaneous-type jolt and squeeze and oil-controlled pattern draw. These machines are connected via conveyor rollers to the pouring and shakeout stations. Somewhat of a closed circuit has been established; molds are rammed, cores set, molds poured and shaken out and the empty flasks returned to the molding station all on the same loop conveyor.

A three-man crew operates the two molding machines, which are set in tandem. Empty flasks approach the machines from the right. The operator separates the flasks and rams the drag half of the mold. He transfers the completed drag to the start of the loop conveyor on the opposite side of his machine. Here the second man of the crew sets cores.

In the meantime, the cope half of the flask is rammed by the second operator. He then closes the completed cope on a core-set drag and rolls the mold to the pouring station.

Production on this setup varies according to the pattern and casting being produced. For example, the crew produces 750 completed molds when the pattern has 40 different castings to the mold, with 40 cores to set, whereas they complete 850 molds when there are only eight castings to a mold and only eight cores must be set.

Under former methods an experienced molder completed 200 molds

(*Concluded on page* 214)

As the flask rolls down the conveyor in the foreground, the first operator takes off the drag and rams his half of the mold. Cope half of the flask rolls to the operator of the second molding machine, who rams it

USE *Industrial* HAND GEARED CRANES FOR GREATER ECONOMY

The Industrial Hand-Geared Crane facilitates assembly of this heavy punch press by accurately spotting the component parts to line up bolt holes.
Courtesy of Di Machine Corp., Chicago, makers of Diebel High Production Presses.

When machinery or heavy loads are to be moved and where accurate spotting of these loads is a necessity Industrial Cranes do an outstanding job. These ruggedly built smooth operating cranes are ideal where runways are short and the production cycle is not too rapid.*

*Industrial Motor-Driven Cranes are recommended where high production rates must be maintained or runways are long.

Industrial
CRANES

INDUSTRIAL CRANE & HOIST CORPORATION
341 NORTH ADA STREET
CHICAGO 7, ILL.
Send Copy of Hand Geared Crane Bulletin.

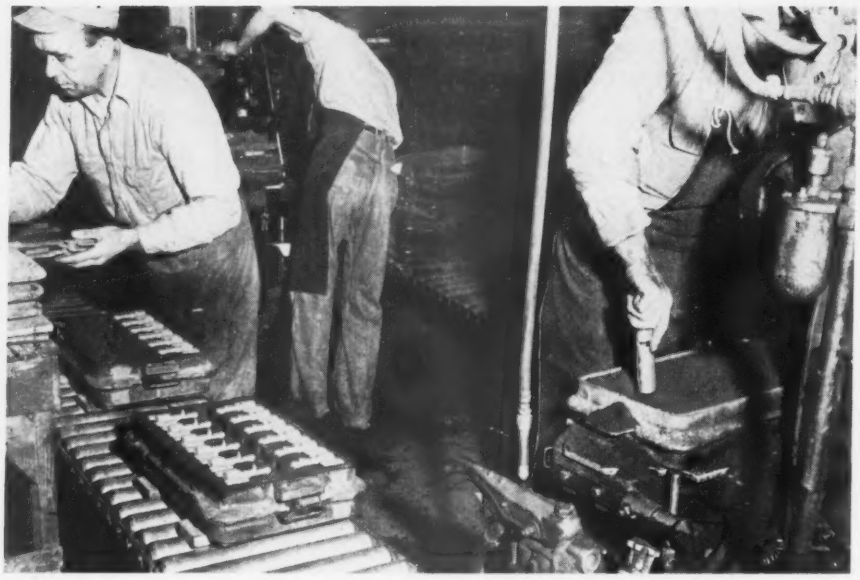
Name_____

Company_____

Address_____

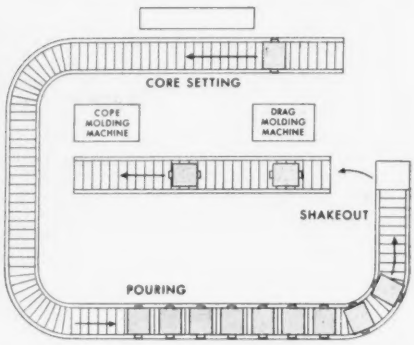
City, State_____

INDUSTRIAL CRANE & HOIST CORPORATION
(formerly Industrial Equipment Co.)
341 NORTH ADA STREET **CHICAGO 7, ILLINOIS**
Overhead Cranes • Jib Cranes • Monorail Systems • Crane Runways
Representatives in Principal Cities HG 754 C



Cores are set in drag, which is rolled down the conveyor to second molding machine operator, who adds cope half of mold

Molding machines are heart of production line, shown below



(*Concluded from page* 212)

during an eight-hour shift. With this new method, 20 per cent more completed molds per man per day are obtained. Although this production increase, which was more than enough to pay for the cost of this installation after one year's operation, is significant, the versatility of this setup is another major consideration. Indiana Brass produces over 370 different types of castings, all precision parts for brass plumbing goods. The castings vary in weight from 1¼ lb, the largest, which are made eight to a mold, to 2 oz. which are made forty to a mold.

Changeover time of the molding machines never takes over 15 minutes at the most. The required number of molds for a casting are run, the patterns changed and production continued with little loss of time. Flask sizes are standard; each cope and drag is 12 x 16 x 4 in. Any job in the foundry can be run on the molding machines.

Indiana Brass melts about 225,000 lb of brass each month. In addition to the three-man crew on the semi-automatic molding machines, three other molders are employed. With this setup, which Osborn field sales engineers helped to design, Indiana Brass obtained a high increased rate of production, versatility and low-cost operation, all vitally necessary to a small producer of intricate castings.

By adapting materials handling and production principles long used by larger foundries, Indiana Brass has achieved notable success. Foundry mechanization is paying it big dividends.

NFA HOLDS REGIONAL MEETING IN MILWAUKEE

RECENT regional meeting of the National Foundry Association in Milwaukee featured a management-labor panel discussion on the theme of "Providing for Employment Fluctuations." Russell L. Moberly, director, Management Center, Marquette University, moderated the discussion. Management was represented by E. F. Ohrman, labor relations manager, Allis-Chalmers Mfg. Co., and Victor Harding, attorney, Whyte, Hirchboek & Minahan. Labor was represented by Robert Gratz, attorney, IMFW-AFL, Local 125, and Bertram McNamara, staff representative, USWA-CIO.

The panel, with questions and participation from the floor, discussed various types or combinations of types of seniority layoff procedures, bumping, recall, job transfers, job posting and bidding, rights of foremen promoted from the ranks and subsequently demoted, and retirement of workers beyond the normal retirement age. Some 65 representatives of foundry management attended the meeting.

Shown at the head table in the picture, left to right, are Mr. Harding, Mr. Moberly; Mr. Ohrman; Summerfield Brunk, Headford Bros. & Hitchins Foundry Co., NFA president; Arthur Hall, works manager, Nordberg Mfg. Co., co-chairman of the meeting; Mr. McNamara; Mr. Gratz; and C. T. Sheehan, NFA executive secretary.

YOU CAN'T SEE WASTE HEAT!

CONTROL OF EXCESS AIR BY CITIES SERVICE HEAT PROVER CAN REDUCE HEAT LOSSES AT CEMENT PLANTS! In cement kilns, air must be controlled to the precise quantity that will just completely burn the fuel. Any excess of air above this amount carries waste heat out of the kiln. THE HEAT PROVER ENABLES THE OPERATOR TO SEE WHEN THE RIGHT AMOUNT OF AIR IS ENTERING THE KILN.

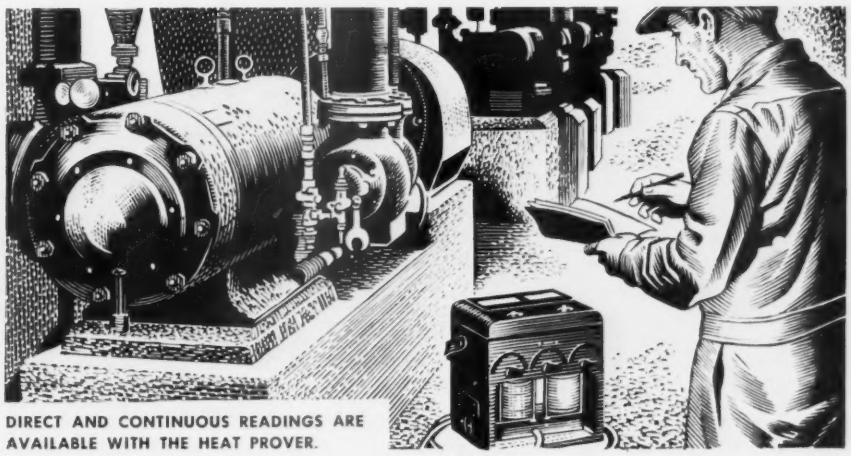
Many air-measuring methods allow only intermittent sampling of kiln gases. With the Heat Prover, direct and continuous readings of kiln combustion are available for immediate use . . . and the Heat Prover can bring about a considerable fuel savings and can substantially increase just about any cement plant's operating efficiency.

WHEREVER A FURNACE OPERATION IS INVOLVED the Heat Prover can help increase productivity and decrease operating costs. It samples rapidly and provides simultaneous and continuous readings of oxygen and combustible gases. The Heat Prover is portable—a technically accurate combustion analysis is obtained in a usable, practical manner. For details call your nearest Cities Service Office or write Cities Service Oil Co., Sixty Wall Tower, New York 5, N. Y.

BUT THE CITIES SERVICE HEAT PROVER CAN!

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS



DIRECT AND CONTINUOUS READINGS ARE AVAILABLE WITH THE HEAT PROVER.

Foundry Mechanization

(*Continued from page* 75)

Another high production sand preparation plant, Fig. 3, consists of sand storage bins with two revolving table feeders and bond hopper. It discharges to a continuous, twin-paddle mixer and produces a continuous flow of prepared sand to the molding system.

Fig. 8 illustrates a modern, mechanized foundry with two molding lines, one arranged with a continuous, car-type mold conveyor, the other with a pallet-type floor for handling the molds. This system provides maximum flexibility for handling a variety of work. Shakeout sand is collected from both systems in a transfer conveyor and is returned to the sand preparation plant by bucket elevator.

Prepared sand from the sand plant is elevated by a belt conveyor to the distributing belt conveyor line, which serves the two molding lines. Some foundries are designed to use belt conveyors in place of bucket elevators if possible. It is apparent that when a belt conveyor is used, more room is required, in order to gain the necessary elevation to the shakeout sand storage bin or from the sand plant to the distributing belt.

Shakeout sand normally can be conveyed on a belt conveyor at an angle not to exceed 18 degrees; a prepared sand belt conveyor should not exceed an angle of 23 degrees. In many instances, these angles have been increased and satisfactory operation achieved, for, as we all know, shakeout and prepared sands vary in each foundry. They do not all behave in the same manner; much depends upon the per cents of moisture, clay, heat, etc.

Maximum production from molding machines can be accomplished by a careful analysis of all operations at the molding station. The molders should be relieved of all duties except making molds and should be provided with an overhead sand supply and the proper type of molding machine. Fig. 5 illustrates a modern, mechanized foundry using continuous, car-type mold conveyors to transport molds to the pouring, cooling and shakeout zones. The molders are relieved of shoveling sand or of carrying molds out to the foundry floor. They merely shift them from the molding machines to the mold conveyor, which is set at a convenient height. Production from each molding machine is greatly increased, and fatigue of the molders is minimized.

Another, modern, mechanized foundry also might consist of two molding lines, one arranged with a continuous car-type mold conveyor and the other line, on the opposite side, arranged with a pallet-type floor for handling the molds. A wide core delivery aisle should be provided between the molding lines. Spill sand would be conveyed back into the system by a belt conveyor system under the molding line, thus eliminating shoveling by the molders.

Mold Handling — Mold handling systems using gravity roll conveyors have the advantage of flexibility and of selected directional movement to suit the day's work. They provide an easy means of access for pouring. Molds may be dumped through an opening in the floor to an oscillating pan conveyor which transports the sand and castings to a central shakeout screen.

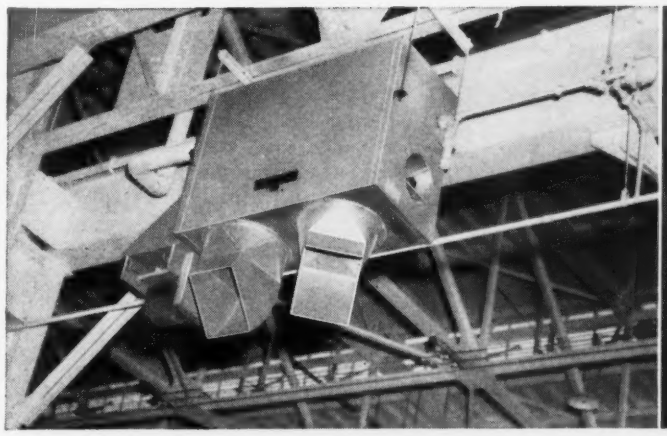
In the semicontinuous foundry, where intermittent pouring takes place, the length of the gravity roll line should be selected carefully, on the basis of production requirements, so that sufficient storage is available before molds are poured. The mold

(*Continued on page* 218)

IF YOU MAKE YOUR OWN
STRAINER CORES
WE INVITE YOU
TO MAKE THIS TEST
WITH PORCELAIN PRODUCTS PORITE
CERAMIC STRAINER CORES
Are you, now, making your own sand strainer cores in your plant—and are you looking for better castings at lower cost? Then—make this test—Free.
We will be pleased to receive your request for free samples from our large stock of standard size ceramic strainer cores. For your own test—simply tell us the sizes and quantities of sand strainer cores you now use—or send us samples of your sand cores. Try PORITE Ceramic Strainer Cores—put Porite to the test. Don't miss this opportunity. Write today.
Porcelain Products' Ceramic Strainer Cores are available in a wide range of standard sizes—or, on special order, in sizes to meet your specifications.
60 years
Porcelain Products, Inc.
PP INC.
FINDLAY, OHIO

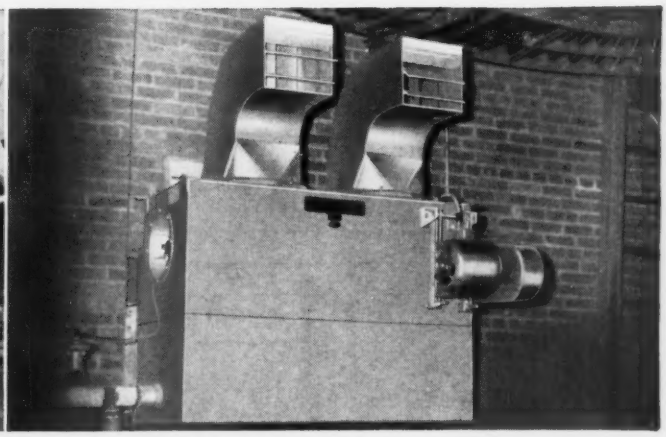
HEAT–VENTILATE YOUR PLANT

WITH THESE SPACE-SAVER "BUFFALO" UNITS!



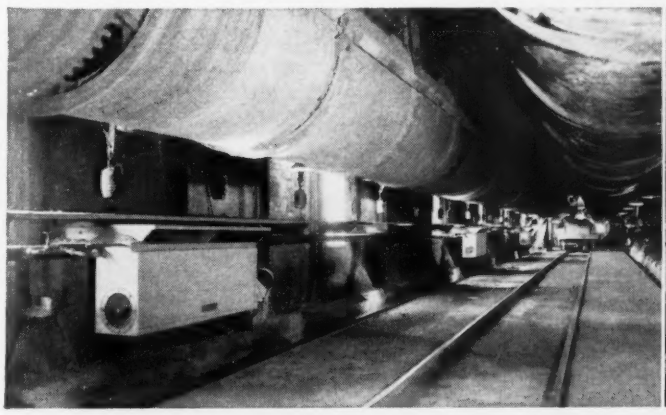
NO FLOOR SPACE REQUIRED

with a "Buffalo" Suspended Lowboy Unit Heater. Easily mounted in roof trusses. Spreads abundant, low-cost heat where you need it. Provides ventilation in warm weather.



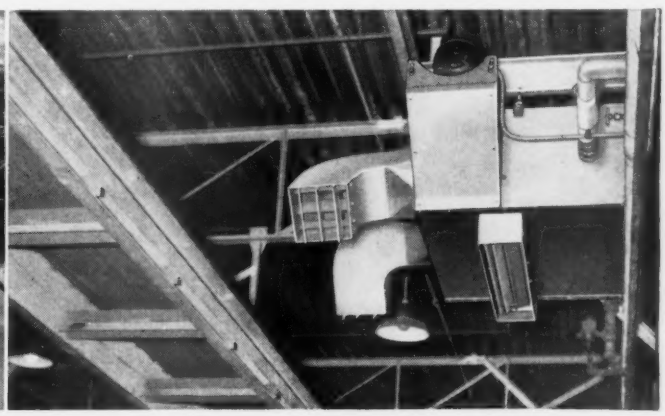
FRESH, CLEAN WARM AIR

(or cool outside air) is delivered by a compact "Buffalo" Highboy Unit with fresh air filtered intake through side wall. Bearing bowl at left permits easy external lubrication.



LOW OVERHEAD — HIGH EFFICIENCY!

Wall-mounted Lowboys provide plenty of heat even where quarters are cramped. New coil design increases heating surface, with narrower coil section. Coils are non-freeze.

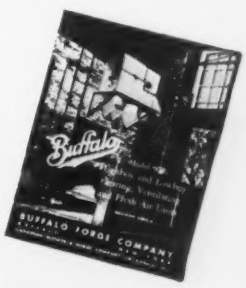


SWIVEL OUTLETS "AIM" FLOW

accurately — a "Buffalo" efficiency feature. Others are "Buffalo" mixed-flow fans with unusually stable performance — standardized parts — lifetime construction.

Let us show you NOW
how low-cost and easy it is

to heat and ventilate your plant. Bulletin 3704-A gives all details on the units to handle your heating — ventilating — makeup air problem. Handy chart gives you air diffusion distances for each unit and capacity up to 35,000 cfm.



Write for Bulletin 3704-A Today!

"Buffalo"

BUFFALO FORGE COMPANY

221 MORTIMER ST. BUFFALO, NEW YORK

PUBLISHERS OF "FAN ENGINEERING" HANDBOOK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.
Sales Representatives in all Principal Cities

PRESSURE BLOWING COOLING HEATING FORCED DRAFT VENTILATING AIR CLEANING AIR TEMPERING INDUCED DRAFT EXHAUSTING

(*Continued from page* 216)

storage zone also should have ample capacity to provide for proper cooling of the molds, so that the molders' production will not be interrupted. In the continuous melting foundry, the gravity roll storage area can be decreased.

In a continuous melting foundry, the power-driven mold conveyor can be employed effectively where the melting rate is in excess of 3 tons per hour. Continuous operation results in a steady flow of material in the foundry and provides centralized pouring, shakeout and cooling zone. A minimum number of flasks or jackets is required with this system, and the finishing department benefits from the continuous flow of material.

The speed of operation of the mold conveyor is determined by the maximum production rate of the molding stations. It should be set about 15 to 20 per cent higher than actual calculations so that there are sufficient spaces on the cars to take care of the fastest molders. The length of the mold conveyor line is determined by the necessary length of the molding stations, pouring zone, weight and jacket shifting or clamping zone and the length required for properly cooling the molds. The latter figure should be based on maximum time for the largest work that will be put on the conveyor.

The mold conveyor provides a centralized shakeout point and may be provided with a cam-type dumping arrangement which automatically lifts the tray top. This shears the mold off the bottom board and discharges it to a shakeout screen where the castings are separated from the sand and discharged to an oscillating conveyor as shown in Fig. 9.

Fig. 10 illustrates the pouring zone of two mold conveyor lines in a high-production mechanized foundry. This area is screened off from the rest of the foundry for proper exhaust of gases from the poured molds. Escalators or pouring platforms are provided for the pourers to eliminate walking while the molds are poured and to assure properly poured molds and a minimum of spillage.

Weights Set Automatically

To eliminate further the manual handling of weights or clamping of molds, an overhead trolley weight conveyor is employed, synchronized with the mold conveyor so that the weights automatically are set on top of the mold in the proper position at the pouring zone. The overhead trolley conveyor is interlocked mechanically with the mold conveyor drive so that it will remain in synchronization with the mold conveyor at all times. See Fig. 11.

Snap flask molding lines can be arranged with pallet-type mold carrying conveyors. The pallets are made up of a light structural frame supported on grooved rollers operating on angle track. Empty pallets with bottom boards are returned on the lower level track. This system provides maximum storage of molds and flexibility of operation.

A counterweighted tilting device at the end of the pallet line dumps the mold, and the mold shears off from the bottom board, which is retained on the pallet. After the mold has been dumped, the tilting device drops and allows the pallet to roll off to a lower run of track, under the mold carrying line. The counterweights then raise the unit to loading position, and it is ready to receive the next tray. The tilting device also can be arranged with air cylinder operation, if preferred.

The ultimate in mechanization by automatic operation includes auto-

(*Continued on page* 220)

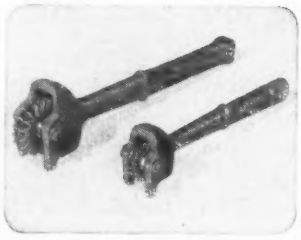
NEW

dresser wears longer
cutters change quicker

Longer life—by far—plus quicker, easier-than-ever cutter change are basic improvements in the patented, new type Desmond Huntington dressers. Supplied at no extra cost in No. 1, 2, 21, and 22 sizes. Note the new construction: hardened side washers, press fitted into head, positively secured with slotted hex head bolts and lock washers. Remove one bolt (with wrench or screw driver) to free spindle for quick cutter change.

Ask your Desmond industrial distributor for Bulletin D-48. He can help make your grinding wheels perform better—longer—with proper dressing.

Desmond-Stephan Mfg. Co., Urbana, O.



Desmond

THE ONLY COMPLETE LINE OF GRINDING WHEEL DRESSERS AND CUTTERS

every study shows a handling saving

80 TONS OF SUGAR PER DAY

SAVES $30 ON EVERY CAR UNLOADED

RETURNS 84% OF ITS COST

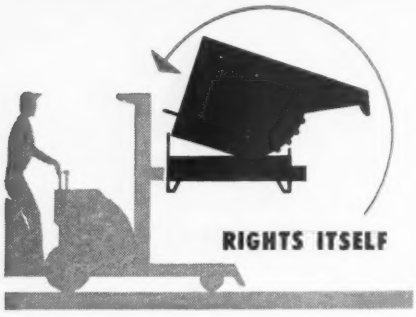
Many companies are checking their handling problems against the American MonoRail Case Study File of "Engineered Applications." The file contains a series of case studies taken from many successful American MonoRail installations. One company saved $30.00 on every car unloaded. Another doubled metal finish production. A glass plant moved 22 tons of glass batch per hour. Another installation returned 84% of its cost in one year. These are just a few of the many studies covered.

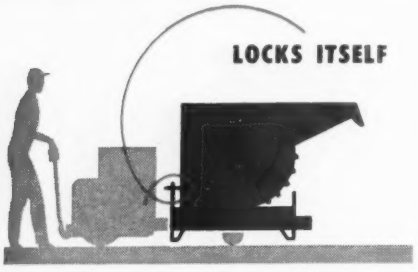
If you want to lower your handling costs, speed up production and cut maintenance overhead, let us send you this file. Just drop us a line on your business letterhead, asking for "Engineered Applications File F-1."

AMERICAN OVERHEAD HANDLING EQUIPMENT

AMERICAN MONORAIL COMPANY

13104 ATHENS AVENUE • CLEVELAND 7, OHIO





makes every truck a dump truck!

Fits securely on any standard fork or platform lift truck . . . can't slip off. Pick-up is quick and easy. Insures fast, efficient handling of any wet or dry, hot or cold bulk materials. *Cuts hand unloading by at least 50%* . . . with maximum safety.

This rugged Roura Self-Dumping Hopper is built like a battleship . . . extra heavy gauge welded construction . . . to withstand the terrific knocks and bangs of rough usage. Good for years of dependable service. Available in sizes from ½ to 2 cubic yards.

Thousands of these time-and-money-savers are now in use by America's biggest industries. Let us show you how they can help cut your costs, too.

ROURA
Self-Dumping
HOPPER

HERE . . . is the easy way to get full details about Roura Self-Dumping Hoppers. Just clip this coupon to your letterhead . . . sign your name . . . and mail to . . .

ROURA IRON WORKS, INC.
1417 Woodland Ave., Detroit 11, Michigan

(*Continued from page* 218)

matic molding machines and automatic sand and mold handling equipment. With this type of mechanization, molding sand is supplied by an overhead distributing flight conveyor, furnishing a full hopper of sand over each machine at all times. Molds are loaded automatically on a mold conveyor and are transported to the pouring zone, where a trolley weight conveyor automatically sets weights on top of the flasks, eliminating clamping. The molds are transported through the cooling zone to an automatic shakeout and transferred to a rollover shakeout. Flasks are shaken out automatically and transferred to the molding machines. The rollover shakeout is air operated with limit switch and solenoid valves.

Synchronized with Conveyor

Many automatic shakeout units are in successful operation. Such a unit can be synchronized with and operated from the continuous car conveyor. The shakeout machine picks up flasks from each car, moves over to a discharge opening and vibrates the flask so that the sand and castings drop out on the conveyor below; it then travels forward and returns the empty flasks to the conveyor car, repeating the cycle for each flask, while the mold conveyor is in continuous operation. This type of unit handles a variety of flask sizes, reduces operating hazards and minimizes dust and production delays.

The trolley conveyor also can be used to transport sand and castings from an oscillating conveyor. The buckets are grouped or nested automatically under the discharge from the oscillating conveyor, with little or no space between them, in order to minimize spillage of sand received from the conveyor. This objective is accomplished by the dip in the trolley conveyor track, and trolleys are located in the bucket bale, allowing the buckets to nest together when they are set on the gravity roll supports that hold the buckets at this point. Sand and castings are transported to the shakeout screen, where the bucket is tipped automatically and discharges.

A new development for transporting shakeout sand and castings is the heavy-duty, positive action oscillating conveyor, arranged with torsion bar mounting. This unit is rugged and economical and has the advantage of low

(*Continued on page* 222)

Pyro Lance!

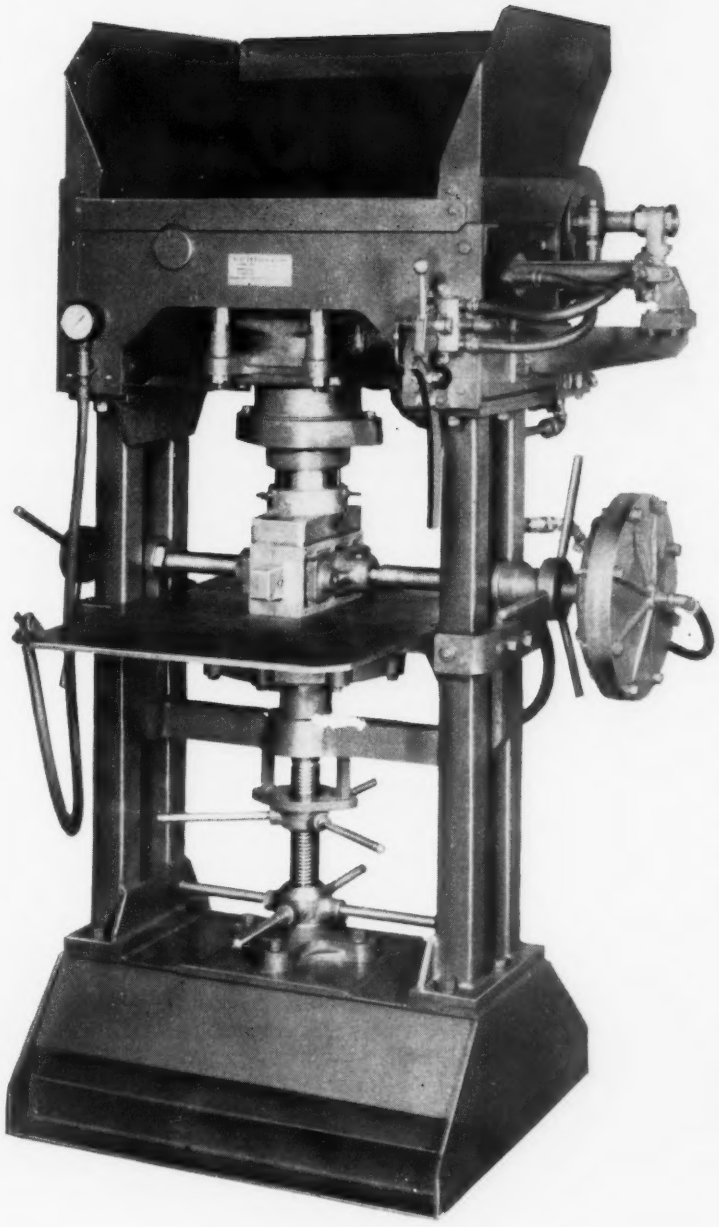
for accurate measurement of heat of MOLTEN METALS

For quick, accurate temperature readings of molten metals, operators of non-ferrous foundries everywhere are relying on the Alnor Pyro Lance. Portable, handy to use, the Pyro Lance has a protected thermocouple, with adjustable angle head, mounted in the lance tip. It takes temperature below the surface—unaffected by dross or other conditions. Here's an easily handled instrument to help control quality in the foundry. For complete information and prices on this valuable instrument write for Bulletin No. 1724-D. Illinois Testing Laboratories, Inc., Room 511, 420 N. LaSalle St., Chicago 10, Illinois.

Alnor

PRECISION INSTRUMENTS FOR EVERY INDUSTRY

Redford NO. 4 CORE BLOWER



Designed to add more power, capacity and speed to traditional Redford simplicity, flexibility and convenience, the No. 4 Redford superbly fills the need for a truly fast and flexible machine to blow cores from a few ounces to 10 lbs.

There is no need for the operator to wait for the machine at any time—the fast operating cycle permits immediate release of the core box after the cores have been blown.

Exhaust air is utilized to thoroughly fluff the sand remaining in the sand magazine after each blow, thus reducing the possibility of cratering.

Magazine heads normally furnished with the No. 2 Redford machine can be used with the No. 4 Redford. Larger new type magazine heads are also available as standard equipment.

A completely new fully adjustable clamp for vertically parted core boxes simplifies core box set up—when not needed the clamp units can be adjusted all the way out or completely taken off the machine.

Redford No. 4 users report production up to 8 boxes per minute using only one core box per machine. To get complete information write for Specification Bulletin 4.

Cores at right illustrate wide range of work that can be done with the Redford No. 4 Core Blower.

Redford IRON & EQUIPMENT CO.

20733 GLENDALE AVENUE • Phone KEnwood 1-8611 • DETROIT 23, MICHIGAN

CESCO RIGHT... before your Eyes!

WHERE TO BUY IT

ATLANTA, GA.
Guardian Safety Equipment Co.
427½ Moreland Avenue, N. E.

BIRMINGHAM, ALA.
L. P. Harless Company
2627 South Seventh Avenue

BOSTON, MASS.
General Equipment Corporation
261 Franklin Street

BUFFALO, N. Y.
The Watson Company
1443 Main Street

CHICAGO, ILL.
Universal Safety Equipment Co.
5115 Diversey

CINCINNATI, OHIO
Williams & Co., Inc.
3231 Fredonia Avenue

CLEVELAND, OHIO
Williams & Co., Inc.
3700 Perkins Avenue

COLUMBUS, OHIO
Williams & Co., Inc.
851 Williams Avenue

DALLAS, TEXAS
Guardian Safety Equipment Co.
900 Jefferson Tower Bldg.

DETROIT, MICH.
Averill Equipment Company
19225 Conant Avenue

EAST ORANGE, N. J.
Guardian Safety Equipment Co.
491 Prospect Street

HOUSTON, TEXAS
Guardian Safety Equipment Co
1915 A Westheimer

INDIANAPOLIS, IND.
Averill Equipment Company
1917 North Goodlett

KANSAS CITY, MO.
Safety, Incorporated
17½ E. 31st Street

KNOXVILLE, TENN.
Safety Equipment Distributing Co.
832 W. Main Street

LITTLE ROCK, ARK.
Fire Appliance & Safety Co.
1114 W. Markham

LOS ANGELES, CALIF.
Guardian Safety Equipment Co.
7223 S. Main Street

LOUISVILLE, KENTUCKY
Williams & Co., Inc.
1109 S. Preston Street

MILWAUKEE, WIS.
Universal Safety Equipment Co.
3155 S. 7th Street

PEORIA, ILL.
Universal Safety Equipment Co.
116 S. Garfield

PHILADELPHIA, PA.
Guardian Safety Equipment Co.
214 S. 45th Street

PITTSBURGH, PA.
Williams & Co., Inc
901 Pennsylvania Avenue

ST. LOUIS, MO.
Safety, Inc.
2608 Olive Street

ST. PAUL, MINN.
Continental Safety Equipment, Inc.
1551 Selby Ave

SALT LAKE CITY, UTAH
Universal Fire & Safety
Equipment Co., Box 1587

SAN FRANCISCO, CALIF.
Guardian Safety Equipment Co.
50 Hawthorne Street

SPOKANE, WASH.
Spokane Safety Appliances
W. 314 Pacific Ave.

TOLEDO, OHIO
Williams & Co., Inc.
650 E. Woodruff Avenue

TULSA, OKLA.
Guardian Safety Equipment Co.
1742 S. Main Street

WICHITA, KANS.
Guardian Safety Equipment Co.
723 S. Broadway

MEXICO CITY, D. F.
Safety Equipment S. A.
Sullivan—95

MONTREAL, CANADA
The Butler Optical Company, Ltd.
1520 Mountain Street

CHICAGO EYE SHIELD COMPANY
2324 Warren Boulevard, Chicago 12, Illinois

CESCO FOR SAFETY

(*Continued from page* 220)

headroom at the transfer point. This feature is important when hot castings are transferred from one conveyor to another.

Casting Handling—Oscillating conveyors for transporting castings from a central shakeout can operate at about 7 to 15 feet per minute to provide maximum cooling time. The conveyor is hooded and arranged with an exhaust system and blower to provide air cooling of the castings in transit. Castings are sprued at the discharge end of the third section of the oscillating conveyor.

Casting handling also can be performed by an apron cooling conveyor on which spruing and sorting is accomplished. This type of conveyor is used where steep inclines are required in handling. It can operate at exceptionally slow speed for maximum cooling time. At the discharge end of the apron conveyor, the castings are taken off the apron, and the sprue is discharged to a shakeout screen, where refuse sand is separated from the sprue and is elevated and discharged to a refuse hopper. This arrangement assures clean scrap iron for the cupola.

Fig. 12 is a view of the spruing and picking section of a heavy-duty casting apron conveyor. Castings are picked off and the sprue discharged to containers which are handled by a trolley conveyor. Containers are discharged automatically, and the sprue then is ready for charging to the cupola.

For transporting large tonnages of heavy castings requiring long cooling periods, the trolley conveyor is the most economical system. The cooling tower in one automotive production foundry is about 4650 ft long. The conveyor picks up the castings at each shakeout point and delivers them to the cleaning room, resulting in a continuous flow of castings that yields economical operation in the cleaning room.

Fig. 13 illustrates the transfer point between the cleaning room and the shipping room trolley conveyor; it is a low-cost trouble-free conveyor for this type of service. Widely separated departments can be tied together by this flexible conveyor, which assures the continuous flow of material necessary in a high production foundry.

Dust Collecting—Ventilating and dust collecting equipment are of vital importance in improving working conditions in the foundry, and they should receive careful consideration. Particularly important are a dust collecting system for the shakeout and a mold conveyor hood. Dust and fumes can be exhausted to the at-

mosphere or to adequate dust collecting equipment. Cooling of sand and fines control also are accomplished by exhausting from screen, revivifier and elevator hood.

Annealing Department — Casting handling in the annealing department of malleable foundries has been developed to eliminate dumping hot packing material and castings on the annealing room floor, a practice which results in dusty haze, excessive heat and disorder. Pots can be unloaded by a shakeout booth arrangement into which the stack is transported by lift truck. A clamping device supports the stack of pots. The pot bottom is lowered and withdrawn at the shakeout, allowing the castings and packing material to drop to a vibrating screen which separates the castings from the packing material. The packing material is returned to the storage bins by an oscillating conveyor, a bucket elevator, a vibrating screen for dust removal and an overhead belt conveyor for distribution. Annealed castings are discharged from the shakeout screen onto a piano hinge apron conveyor which carries them to the cleaning room.

Summary — In planning foundry mechanization, foundrymen should keep in mind an over-all picture of the complete operation, from raw material to finished casting, so that all departments can take full advantage of the investment and so that there will be no interference in the flow of material. The art of materials handling is well illustrated in the mechanized foundry, for practically every type of materials handling equipment is utilized to provide the wide variety of services that is required.

Every foundry is different and presents its own problem, which should be studied individually, with the help of engineers who have had experience in mechanization of a wide variety of foundries. Flexibility of operation is of prime importance, and the over-all plan should be considered carefully when units are to be installed in a step-by-step program.

AFS Indexes Transactions

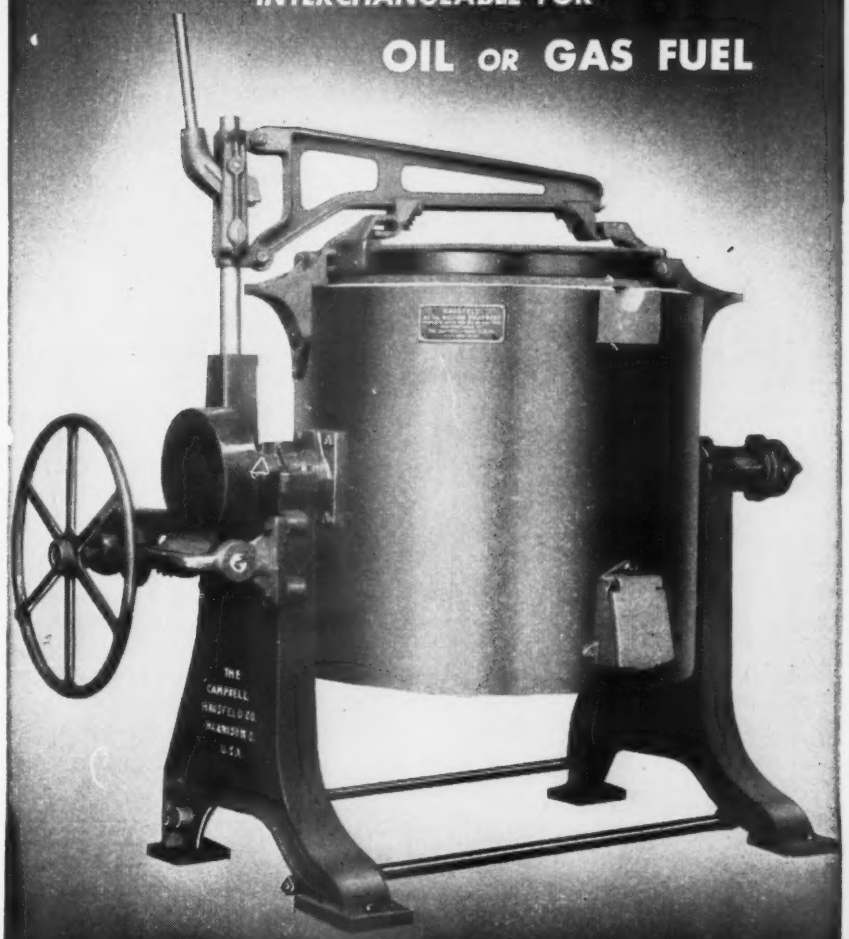
American Foundrymen's Society has published the fourth periodical index to the bound volume transactions of the society. The index covers volumes 49 to 58 (1941-50), inclusive. Both a subject and author index are provided. Copies are available by writing to the AFS, 616 South Michigan Ave., Chicago 5. Cost to members is $2.75, to nonmembers $4.25.

HAUSFELD

A FURNACE FOR EVERY NON-FERROUS MELTING REQUIREMENT

INTERCHANGEABLE FOR

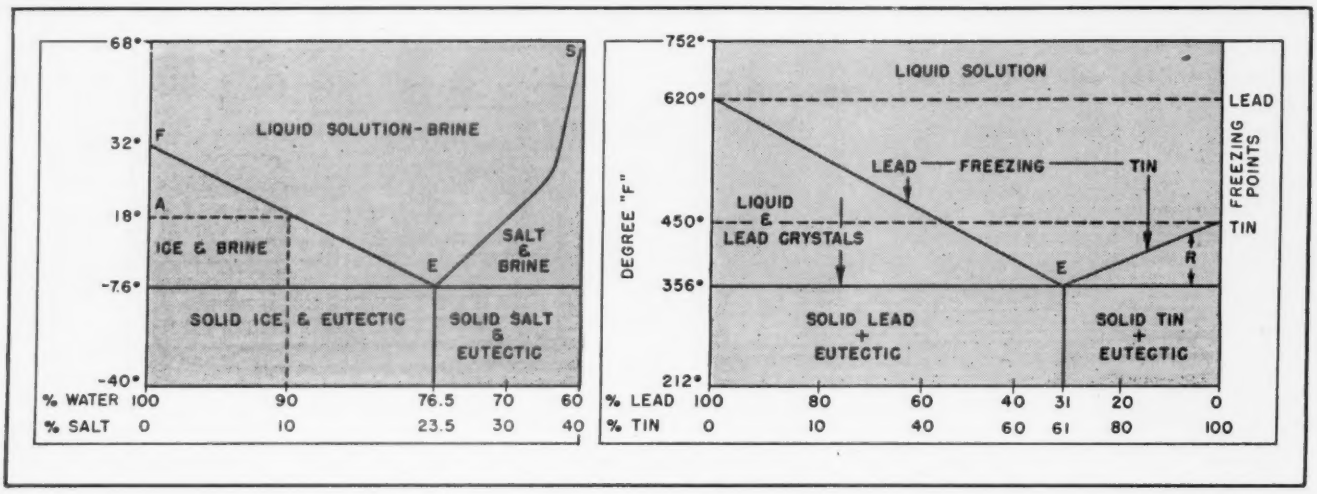
OIL OR GAS FUEL



Built for Service

The Campbell-Hausfeld Co.

300-320 MOORE ST. HARRISON, OHIO



Salt and water produce a brine which does not remain in solution when solid, but mixes mechanically

When lead and tin are mixed and melted together, then frozen to a solid, they form separate crystals

Fundamentals of Metal Solidification

T. H. TREVITHICK

ALL metals have different melting temperatures. When melted they become a "liquid solution" and when freezing to a solid they form either a "solid solution" or a "mechanical mixture."

Metals having the highest melting temperatures freeze or solidify first and as the mass freezes, certain elements in the compound will unite to form a solid solution. Others resist this unity and freeze in separate crystals, forming what is termed a "mechanical mixture." The last portion of the compound to freeze is called the "eutectic."

Some metals have an affinity for each other, like gold and silver, and when melted together become so intimate that it is impossible to detect the gold from the silver with the most powerful microscopes. Gold melts at 1945° F and silver at 1760° F. It will be seen that the melting temperature of the mass will drop in proportion to the increased additions of silver. When melted the mass goes into liquid solution and when frozen forms a solid solution.

Diagrams are used to chart the various constituents of a given mixture and the different melting temperatures of the components. The water-salt diagram is used to illustrate this in the simplest manner.

These diagrams are generally shown with the temperatures plotted vertically and the compositions (percentage) shown horizontally.

In the accompanying example, F = the freezing point and E the eutectic. FE is the freezing point of the water as varying amounts of salt are added. The eutectic of the composition is 76.5 per cent of water and 23.5 per cent of salt.

S = the freezing point of salt. The line SE indicates the point at which salt begins to separate or freeze out as the addition goes beyond the balanced eutectic composition.

When we mix salt and water we form a brine; thus we obtain a liquid solution but, unlike gold and silver, it does not remain in solution when solid but becomes a mechanical mix.

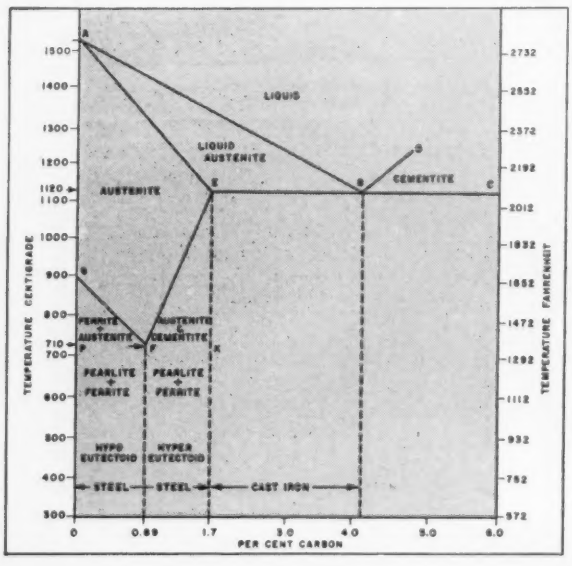
The brine will stay liquid down to 18° F (A on the diagram) on line FE, at which point ice crystals will form. The liquid will continue to absorb the salt up to the amount of 23.5 per cent.

Upon dropping to a temperature of −7.6° F, the mass will become a solid consisting of ice crystals and eutectic grains. This eutectic will attain an equilibrium of exactly 76.5 per cent water and 23.5 per cent of salt, a mechanical mixture of salt and water.

Any salt in excess of this balance will, if the brine is cooled to temperature intersecting the line ES, freeze out in the form of separate salt crystals, indicating that the salt is above the eutectic balance. The liquid will, however, continue discarding the salt until it reaches the eutectic temperature of −7.6° F.

Lead and Tin—Another example which illustrates a mechanical mix-

(*Continued on page* 226)



Temperature points shown on the vertical scale indicate the temperature at which transformation occurs while iron-carbon mix goes from solid to liquid state and vice versa

THE IDEAL METHOD:

INDUCTION MELTING

for all metals...

Fast, efficient melting

Exact reproduction of analysis

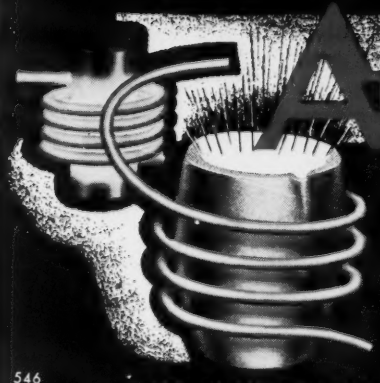
Positive temperature control

Minimum metal loss

Highest production rates

Sizes from 8 ozs. to 8 tons

Write for information



AJAX NORTHRUP SINCE 1916

INDUCTION HEATING-MELTING

AJAX ELECTROTHERMIC CORPORATION • TRENTON 5, NEW JERSEY

546

ASSOCIATED COMPANIES: AJAX ELECTRIC FURNACE CORPORATION • AJAX ELECTRIC COMPANY • AJAX ENGINEERING CORPORATION

(*Continued from page* 224)
ture and eutectic balance is lead and tin. Upon mixing and melting together, then freezing to a solid, they become separate crystals of lead and tin with the eutectic balance of 31 per cent lead and 69 per cent tin at a temperature of 356° F. These are simple examples but they show the basis of metal mixing and melting.

Iron-Carbon Diagram — This diagram leads us one step further than the salt and water system.

By studying the iron-carbon diagrams, it will be seen that all solids exist below about 710° C, the composition being made up essentially of pearlite and ferrite. The carbon content of the steel is shown on the lower horizontal line. It will also be noticed that the terms "hypoeutectoid" and "hypereutectoid" are used between 0.0 carbon and 1.7 carbon, with a dividing line at 0.89 carbon. This indicates that all steels containing less than 0.89 per cent carbon are known as hypoeutectoid steels, while those containing from 0.89 per cent up to 1.7 per cent carbon are known as hypereutectoid. This is the dividing point between steel and cast iron. Pearlite and ferrite are shown in the diagram as existing in solid formation below approximately 710° C.

Pearlite is a mechanical mixture of cementite or carbide of iron, in the proportions of 88 parts ferrite and 12 parts cementite.

Above F and G, or from 710° C to 900° C, we have ferrite and austenite, from B to D we have liquid cementite, between E, B, and A the austenite is liquid and between these ranges, or from 1150° C to about 1520° C, the entire mass is liquid.

To summarize: Austenite is a solid solution in which iron is the solvent.

It is in a complete liquid state at a temperature of 1150° C and is partly solid between 750° C and 850° C. As ferrite is forming within these temperatures, it is known as the transformation stage. This is the critical range of all ferrous metals.

When steel has to be heat treated, such as quenched and tempered, it is heated to within this range of temperature before quenching. Also when hard white cast iron has to be made malleable, the castings are allowed to soak within this range to form temper carbon, which has been absorbed by the liquid austenite at a higher temperature and is now being discarded, as austenite cannot hold more than a definite amount of carbon when it is liquid, or at a temperature above the critical range.

Microconstituents—By referring to the iron-carbon diagram, it will be noted that the temperature points shown on the vertical scale indicate the temperature at which transformation occurs while the metal is going from the solid to the liquid state or vice versa. As shown in the diagram, all solids exist below 710° C or 1310° F, the solid composition being essentially ferrite and pearlite.

In going down through the temperatures, from 1150° C to 710° C, different structures take place, from the solid solution of austenite (carbon and iron), down to pearlite, but the complete decomposition from austenite to pearlite requires slow cooling, and passes through different stages or structures. These different structures are evident when microphotographed and are known as microconstituents.

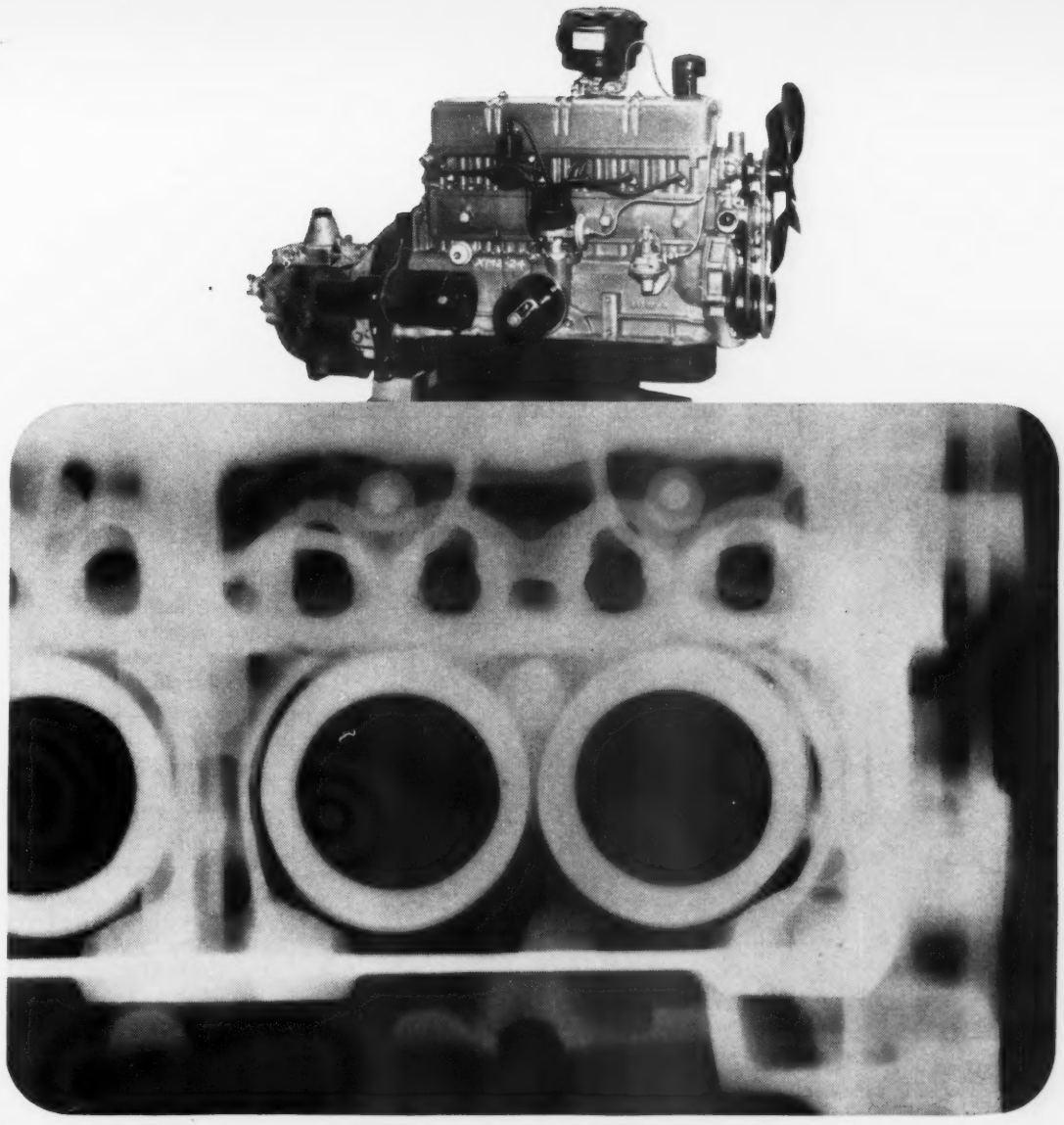
(*Concluded on page* 228)

Present Gifts to University of Wisconsin

A FOUNDRY shakeout especially designed for the school has been presented to the University of Wisconsin, Madison, Wis., by Hewitt-Robins Inc., Stamford, Conn. Harry A. Schuler, manager of Hewitt-Robins conveyor sales in the Chicago area, represented his company and made the presentation to Dean Kurt Wendt, College of Engineering.

As part of the program, James Ewens, vice president, Grede Foundries Inc., Milwaukee, and chairman of the Wisconsin Foundry Educational Foundation Industry Advisory Committee, presented scholarship certificates to 13 university scholarship holders.

In the top illustration, Mr. Schuler, on the extreme right, presents the shakeout to Dean Wendt as Mr. Alden of Hewitt-Robins and two FEF scholarship holders look on. In the lower illustration, left to right, are Mr. Ewen; Prof. E. R. Shorey, chairman of the university's department of mining and metallurgy; W. R. Tanner, president, Zenith Foundry Co., West Allis, Wis., and a trustee of the FEF; E. J. Walsh, executive director of the FEF; and James H. Dance, president, University of Wisconsin Student Chapter of the AFS, and FEF scholarship holder.



Production line "bugs" get X-RAYED out on the pilot model

MASS production of car engines calls for a continuous run of castings as uniformly sound as it's possible to pour. No sand holes. No gas holes. No core shifts.

Manufacturers take care of that early in their plans. They radiograph pilot castings—can spot thin walls, "out-of-rounds," and other irregularities which a change in casting procedure can forestall.

Improving yield is one of the reasons more and more foundries are making radiography routine. It is the one way to be sure only high-quality work is released.

Radiography can improve your plant operation. How? Your x-ray dealer will tell you. Or, we'll send you a free copy of "Radiography as a Foundry Tool."

EASTMAN KODAK COMPANY
X-ray Division, Rochester 4, N. Y.

Radiography...

another important example of Photography at Work

Kodak

(*Concluded from page* 226)

Austenite—The structure known as austenite is the solid solution formed by carbon and ferrite when reaching a temperature of 1120° C. Austenite cannot be retained at room temperature unless the steel is alloyed with a high percentage of either manganese or chromium. A typical example is Hadfield steel or steel containing 12 per cent manganese, which as cast is quite brittle, but has very high tensile properties and relatively high ductility upon adequate heat treatment; its tensile strength approaches 125,000 psi and an elongation up to 35 per cent in 2 inches. Its surface hardens with cold working while still preserving a tough core or interior and is nonmagnetic. It is, therefore, an austenitic steel, its austenite structure being maintained by the manganese alloy in proper balance.

Martensite—Martensite is a structure in plain carbon steel which follows the decomposition of austenite when quickly quenched from a temperature above the critical range. It is very hard and brittle. It is used for cutting edges in carbon steel, files and other cutting tools.

Troosite—Troosite is the structure which is formed by the decomposition of martensite. It is usually obtained by tempering the steel in the martensite structure at from 320 to 360° C.

It toughens the steel and should be formed back of the martensite (the hard or cutting edges of steel) to overcome embrittlement. It usually is descernible with varying amounts of martensite and sorbite and rarely completely separated. Like sorbite, it is actually an intermediate structure.

Sorbite—This is the structure which gives the greatest toughness to a given steel. It is obtained by slow cooling from the critical range and by slowly heating martensite to between 400 and 450° C, also by prolonged heating of the troosite structure to between 400 and 450° C. It is the structure obtained before the lamellar formation of pearlite.

Cementite—Cementite is iron carbide and in the microstructure shows up as a network. It is an extremely hard substance which is high in tensile strength and with no ductility.

Pearlite—Pearlite is a lamellar formation of ferrite and cementite. In the eutectoid, it contains 88 parts carbon and 12 parts ferrite. This lamellar structure exists in all plain carbon steels after an anneal.

Graphite—Graphite is pure or free carbon and is precipitated in this form during the slow cooling of the casting or by an annealing process. The precipitation in cast iron is promoted by slow cooling and increases with additions of silicon. This precipitation is suppressed by quick cooling or chilling, forming excess proportions of iron carbide and a hard casting is the result.

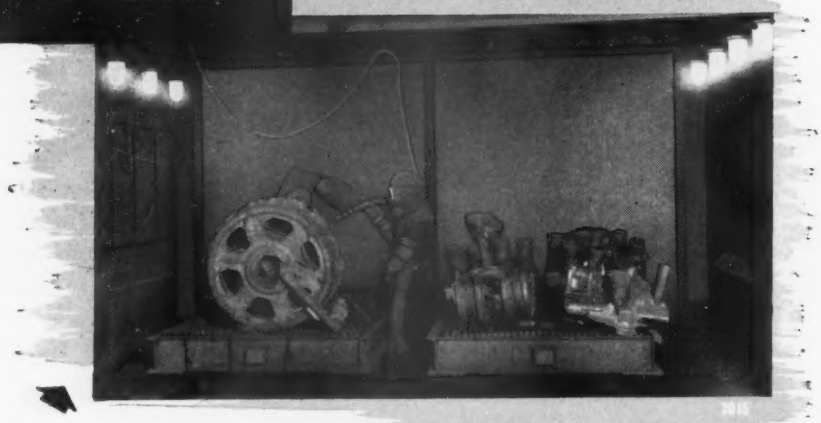
Steadite—Steadite is a hard compound found in cast iron; the amount present depends upon the percentage of phosphorus in the iron. It is formed during the graphitization process in cast iron. It consists of approximately 10 per cent of phosphorus and, when in eutectic, forms binary cells of iron and iron phosphide.

In some forms of chilled and mottled iron, however, cementite remains to form a ternary combination of cementite, iron and iron phosphide.

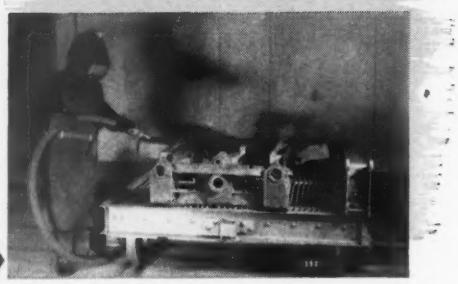
It is the last compound to freeze in cast iron and goes into solution with ferrite at about 950° C or dissolves in the iron at prolonged annealing at approximately 850° C.

In high-phosphorus iron steadite can be traced in the microstructure as a network surrounding the eutectic cell formation.

SLY ARMOURED* BLAST ROOMS



A 16′ x 16′ Sly Blast Room with double track for two cars. Both cars can be used for a single large casting. Note how perforated floor plates keep coarse refuse from entering hopper below.



This view shows a Sly Blast Car in a Sly Blast Room. Perforated floor plates are supported by grating preventing plates from warping. Observe how tops of rails are flush with floor. Operator wears a Sly "Purair" Helmet.

Whatever Size Your Castings

And whatever your tonnage we have a standard blast room to suit. We have built blast room equipment for the cleaning of the inside of tank cars, for large airplane fuselages, for structural assemblies, tanks, railroad cars and locomotives. Some large blast rooms are self-contained buildings.

STANDARD SLY BLAST ROOMS

Inside width: 8 ft., 10 ft., 12 ft., 14 ft., 16 ft. • Inside Length: 8 ft., 10 ft., 12 ft., 14 ft., 16 ft. Inside Height: 7 ft. 3 in., 8 ft. 3 in., 9 ft. 3 in. • Larger Blast Rooms for special purposes.

***ARMOURED** An extra layer of detachable 3/16" steel wear plates to protect the walls. • An extra layer of steel grating to reinforce the floor against sagging. (Exclusive Sly features)

THE W. W. SLY MANUFACTURING CO.

4753 TRAIN AVENUE • CLEVELAND 2, OHIO

New York • Chicago • Philadelphia • Syracuse • Detroit • Buffalo Cincinnati • St. Louis • Minneapolis • Birmingham • Los Angeles • Toronto

No matter what grinding method you use...

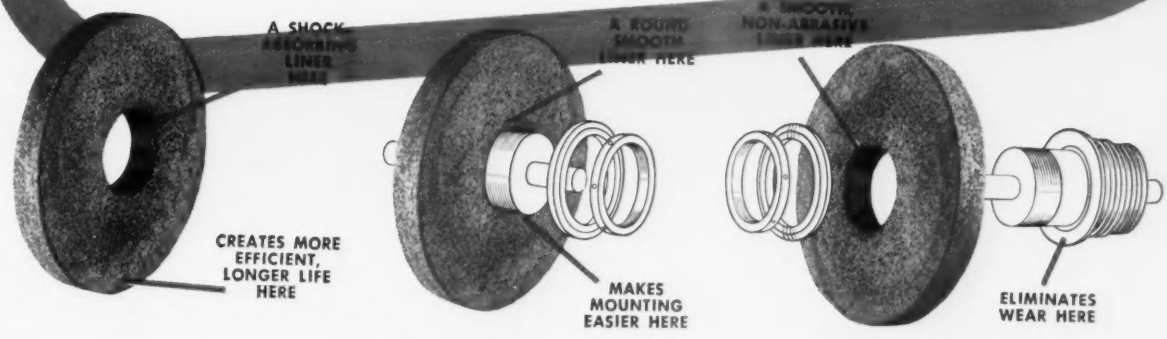
MID-WEST SNAGGING WHEELS ARE MORE EFFICIENT!

Here are the two big reasons for Mid-West's low-cost efficiency. They're ready to go to work for you!

1. Mid-West designed fiber-cushioned arbors minimize vibration. They're baked-in shock absorbers bonded in for life!

2. Mid-West snagging wheels' extra-tough bonds are designed especially for billet snagging, grinding of steel and alloy castings, and snagging operations on all types of non-ferrous metals and cast irons.

Here is real grinding efficiency that's bound to help you cut high production costs. For complete information—write, wire or phone today.



MID-WEST ABRASIVES

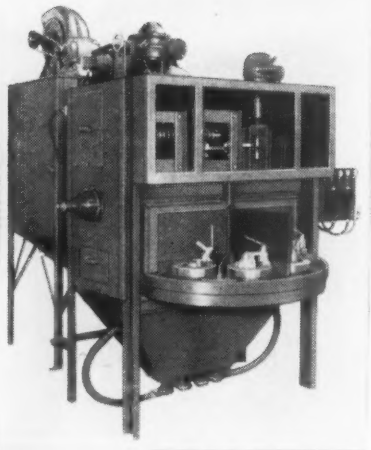
Executive Offices:
510 South Washington St., Owosso, Mich.
Factories: Owosso, Mich. • Rochester, Penna.

MACLEOD
ABRASIVE BLAST EQUIPMENT

NEW! the HIGH-SPEED

MACLEOD "RAPID-BLAST"

BLAST CLEANING CABINET

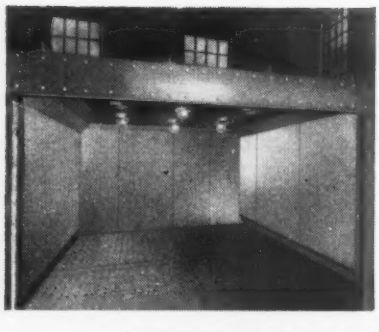


The brand new Type AL "Rapid Blast" is specifically designed for high rate of continuous production. Features automatic, positive-locking, indexing rotary table, and can be furnished with interchangeable work chucks for runs of different items. Particularly adaptable for internal cleaning of work.

MACLEOD

BLAST CLEANING

ROOMS



Available in standard or special sizes as required. Can be equipped for chain-fall hoist or for blast cars. Air baffles replaceable. Dust Arrestors (at right) also available for adjacent or outside building installation.

57 YEARS of SERVICE TO INDUSTRY

The MACLEOD COMPANY
44 Mosteller Rd., Sharonville, Ohio

Send this coupon for MACLEOD Bulletins:
☐ No. 300-A Cabinets ☐ No. 600 Rooms

NAME _____
ADDRESS _____
CITY _____ ZONE ____ STATE ____

Investment Castings

(Continued from page 97)

In primary investment, assemblies are dipped in a sodium silicate binder or dip coat and then dusted with a 300-mesh sand. Dusted assemblies are shown in Fig. 8. The operator is wiping off the base of the sprue to permit better bonding of the base to the bottom board. The fine mesh sand provides the fine finish which marks investment castings.

After the primary investment, the pouring basin of the sprue and pattern assembly is placed on a steel plate and attached with liquid wax. Position of the pattern on the board is similar to that of the primary invested assemblies shown on the rack in the background of Fig. 9. A stainless steel flask is bonded to the bottom board with wax, as shown in Fig. 9. Wax also is used to seal the flask and bottom board on the inside. A turntable mounted on a slant is used to facilitate the movement of the wax on the inside of the flask. Paper tops on the flask, as shown in the illustration, permit a higher level of investment slurry; this head eventually is cut off.

Vibration Compacts Slurry

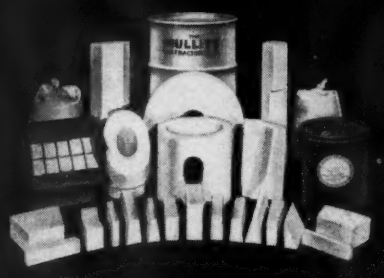
Dry ingredients used in the slurry are weighed on the second floor and then placed in hoppers to be conveyed to the mixer on the floor below. These ingredients consist of grog, silica sand, tetraethyl silicate and magnesium oxide, which acts to accelerate the hardening of the slurry. The heart-shaped panel near the operator's head in Fig. 10 holds the flexible metal base and pipes used to convey sand and wet ingredients to the blender from hoppers and storage tanks.

After it has been mixed thoroughly, the secondary investment slurry is scooped out of the tumbler or mixer, shown in the background of Figs. 10 and 11, and poured into the assembled flasks. Flasks rest on a small electric vibrating table while being filled. After they have been filled, the flasks are placed on one of two vibration tables which are designed to settle the secondary investment slurry, eliminate air bubbles and fill out the detail around the wax assembly in the flask. Vibration continues for about ½-hour. The vibrating table shown in Fig. 11 was developed by Howard engineers and uses one main crankshaft and connecting rod. The unit distributes the vibration over the entire 5 x 5 ft table area.

After the slurry has become firm, the flasks are transported to the dewaxing oven, where the "head" and

SHAMVA®

Since 1926 exclusive producers of MULLITE brick, special shapes and specialties



designed for:

HIGHER TEMPERATURE APPLICATIONS

LONGER SERVICE LIFE

for use in:

- Direct & indirect arc furnaces
- Induction furnaces
- Open flame furnaces
- Crucible furnaces
- Cupola spouts & breasts
- Ladles

SHAMVA Mullite brick, special shapes, ramming mixes and other specialties are engineered to *your* specific needs. Write for SHAMVA field engineering service.

New catalog now available

THE MULLITE REFRACTORIES CO.
SHELTON 4, CONNECTICUT

paper top and the bottom board are removed. Production numbers then are painted on the bottom of the molds, as shown in Fig. 12.

This is the point in the process from which it derives the "lost wax" name. Molds are placed on a 40-ft, continuous, conveyorized dewax oven with the gate down. The furnace is shown in the background of Fig. 12. In a temperature of 350° F, the wax melts, flows out of the inverted pouring basin, is trapped and is collected for reuse in the preparation of sprues.

In normal procedure, the molds then move to the curing ovens, but the investment molds may be stored indefinitely. Simple racks, Fig. 13, are used to store the molds, which are placed so that the production numbers face out for ready identification. Preproduction of molds promotes flexibility in production melt schedules.

Thirteen gas-fired furnaces in the production bay, similar to the one shown in Fig. 14, are used to cure the molds. Molds are heated to 1800° F, a process which requires 4 to 5 hours, and are held at that temperature for 6 to 8 hours. Heat volatilizes all of the remaining wax, prevents gases from forming in the mold during pouring and cures the molds to withstand the high temperatures of the molten metal. Molds then are lifted from the furnace with tongs and placed on a wagon for almost immediate pouring. The spring support on the pouring wagon, which prevents jolting of the mold, may be seen at the lower left of Fig. 15.

Induction Melting Flexible

Metal is melted in four induction furnaces of 200-lb, 100-kw and 100-lb, 100-kw capacity. The company stresses the importance of induction melting in providing a self-cleaning of the metal because of the stirring action. Induction melting permits the company to be flexible in handling a variety of both ferrous and nonferrous alloys.

Metal is tapped from the furnace into a ladle, as shown in Fig. 15, and the mold is poured. Pouring temperature of steel alloys is 3000°F. After pouring, the metal in the pouring gate is covered with silica sand. A sample of every heat is poured into a small core, shown on the wagon in the illustration, and this is sent to the laboratory for chemical analysis.

Many tools are used in the laboratory to maintain a high standard of quality. Fig. 16 shows an instrument for determining the carbon content of metal samples. Other laboratory facilities include x-ray, Magnaflux, Zyglo equipment and an optical comparator. Castings also are checked

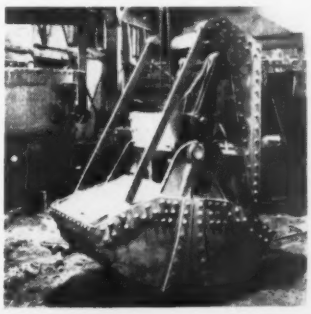
• HANDLE COKE WITH MINIMUM DEGRADATION • HANDLE SAND WITHOUT LEAKAGE

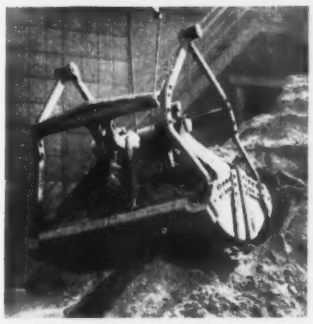
with the same BLAW-KNOX DUAL-PURPOSE FOUNDRY BUCKET

• BLAW-KNOX "Shark Tooth" Single-Line Hook-On Buckets cut the cost of rehandling coke, coal, sand, and small limestone because one bucket, with easily attached or removable liner plates, is all you need. With the plates attached, fine granular materials are handled without leakage. Without the liner plates, the "shark teeth" literally finger their way through the coke, so it may be handled with minimum degradation. Hook-On feature permits quick detaching for change to magnet.

Above—Rated 1-cu. yd. closed head type Blaw-Knox "Shark-Tooth" Bucket, without liner plates, reeved 2-parts for 13'6" headroom. Range of sizes for every requirement.

Right—This open head type Blaw-Knox Bucket, rated 1-cu. yd., is equipped with liner plates for rehandling sand, coal, limestone, etc. Shown reeved 2-parts for 8'9" headroom. Choice of sizes.





BLAW-KNOX BUCKETS help solve average or unusual conditions

FOR AVERAGE HEADROOM—There's a type and size of Blaw-Knox Single-Line Hook-On Foundry Buckets to meet a wide range of operating conditions. Take advantage of the Blaw-Knox engineering service available without obligation to help you select the bucket best suited to your needs.

FOR LOW HEADROOM—This Blaw-Knox Single-Line Hook-On Bucket solves rehandling problems when headroom is extremely limited. The ¾-yd. capacity bucket requires only 6'7" operating headroom. Also available in larger sizes.

Write for Bulletin 2232 today

BLAW-KNOX COMPANY
BLAW-KNOX EQUIPMENT DIVISION
Dept. 971
PITTSBURGH 38, PA.
Offices in Principal Cities

BLAW-KNOX FOUNDRY BUCKETS

THE MOST COMPLETE RANGE OF SIZES AND TYPES

dimensionally in fixtures when required. Turbine blades, for example, have complete gages for checking. An average blade has at least four gages. On jobs requiring heavy runs, a master gage is available for checking the others.

After the mold has been allowed to cool 8 hours, the castings are knocked out. Each gate of castings is tagged with information on date cast, part number, material, heat number and order number. A high-speed friction band saw is used to cut off sprues and risers from the castings, as shown in Fig. 17. Before and after sprues are cut off, the castings are metal blasted and then sand blasted. Each sprue and its castings are placed in a metal pan and move through cleaning and inspection together.

Photography is a quality control technique utilized by Howard. Gates and risers of assembled patterns are photographed and cataloged with information on alloy, weight, dimensions and production techniques. The photographic library helps iron out production problems, assists in training new personnel and greatly reduces the chance of error on the part of experienced personnel. A new type of camera is being used for this purpose—a 4 x 5-in. press camera with a Land camera attached at the back. Photographs are taken through the fine lens of the press camera and are exposed on the film of the Land camera. Prints are obtained in about 60 seconds.

Special attention is paid to engineering the casting. A new engineering department with 12 drafting tables houses this operation. A soundproof conference room is located near the engineering department.

Complicated designs are possible through the investment casting process. Typical castings are shown in Fig. 1. Average size of castings being produced at the plant is about 7 in. in any one dimension. Weight of the castings now average about 8 lb. Minimum wall thickness usually is not less than 0.045-in., although when design demands, an edge thickness of 0.030-in. can be cast. Holes are cast to the same tolerances as the remainder of the part. Hole diameters in a ¼-in. section may be as little as 0.050-in. Often holes are cored in parts to reduce shrinkage that might otherwise occur in the wax pattern or cast part. Average as-cast finish of precision parts is 125 micro inches, although castings are produced with finishes of from 90 to even 70 micro inches.

Precision castings generally have better physicals than sand castings. Usually interest is greater in comparisons between properties of investment castings and forgings. Tensile and yield strengths are about the same, but elongation of investment castings is slightly less. Best properties of a forged or rolled structure are obtained parallel to the working or rolling, whereas mechanical properties of investment castings are the same in all directions.

Pouring the water-cooled electrode holder shown in the picture below at City Pattern Foundry and Machine Co.

Cleaning a water-cooled electrode holder to smooth out parting lines, gate and riser contacts, etc.

A typical foundry specializing in beryllium copper

City Pattern Foundry and Machine Co., of Detroit, started operations 41 years ago with three men in a 20′ x 30′ room. Today it employs 300 men in a plant area of 50,000 square feet, and can provide a complete service from blueprint to machined castings ready for assembly. Most of the Berylco castings City Pattern produces are of high-conductivity, high-strength beryllium copper alloys for various resistance welding applications. Many welding jaws, resistance welding dies, and electrode holders are now being cast in Berylco, particularly where size and shape requirements—as in the holder shown on the left—prevent the economic use of wrought materials. Berylco resists heat checking, mushrooming and sticking. Its added hardness, as compared with other alloys, gives better service under the high pressures met in welding materials like stainless steel.

CAN YOU HANDLE BERYLCO?

We will be glad to assist any foundry in handling beryllium copper casting alloys. Write, wire or phone today. For a complete listing of available alloys, write for your free copy of the Berylco Product Directory.

THE BERYLLIUM CORPORATION

DEPT. 4H, READING 8, PENNA.

BERYLCO

New York • Springfield, Mass. • Rochester, N.Y. • Philadelphia • Pittsburgh • Cleveland • Dayton • Detroit • Chicago • Minneapolis • San Francisco • Los Angeles

Representatives in principal world-trade centers

Noise Abatement Is Topic Of Symposium

How can industry reduce machinery noise? This question will be the theme of the fifth annual National Noise Abatement Symposium to be held Oct. 21-22 at the Illinois Institute of Technology, Chicago. Factory problems will be analyzed in discussions on noise control of machinery, handling materials, testing products and the sales appeal of quiet products. The symposium chairman will be Stannard M. Potter, supervisor of sound and vibration control, Armour Research Foundation. More than 300 industrial, civic and research leaders are expected to attend.

Stress vs Strain

(*Continued from page 79*)

observation also checks with experience as well as with Brinson's and Duma's findings.

Another interesting point from Figs. 4 and 5 is that the restriction of heat flow due to the enclosed core and the shifting of the longitudinal thermal centers toward the core surface must move the thermal center of the straight "L" junction fillet away from the mold surface. This move should decrease the possibility of hot tears at the fillet. Visible hot tears and ruptures at this point are not particularly common, but magnetic particle indications are. Since these thermal data became available, a few of these indications have been investigated to ascertain they were hot tears. To date, not all have been hot tears; some have been a type of shrinkage between the as-cast dendrites, as shown by Fig. 7. This photomicrography emphasizes an important point in a study of hot tears. All magnetic particle indications are not hot tears, and the assumption that they are hot tears may lead to much confusion.

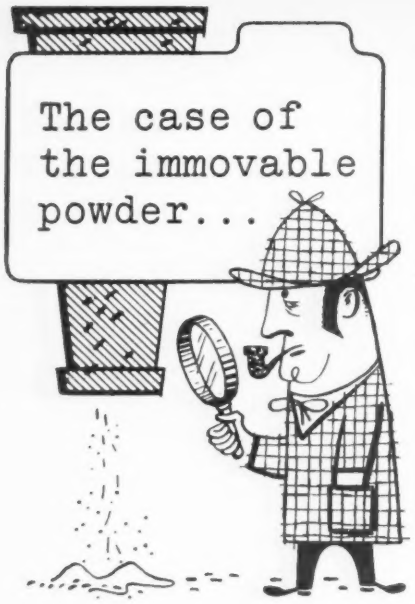
Discrepancies Are Revealed

This interdependence between stress and strain, especially the chicken and egg aspect, is further emphasized by Middleton's recent work[6]. Figs. 7 and 8 summarize the part pertinent to this discussion. Middleton determined the degree of hot tearing and the loads developed during cooling for castings restrained by a number of different sands. At first glance there seems to be an almost perfect relation in Fig. 7 between the load (stress) and the amount of hot tearing. However, close study reveals some curious discrepancies. Why does the load for the 2 per cent linseed oil sand increase so greatly (800 per cent), whereas the amount of hot tearing increases only 220 per cent compared to a very similar sand containing $1\frac{1}{2}$ per cent linseed oil? Why does the urea-formaldehyde sand hot tear similarly to the bentonite sands although the load developed is practically zero?

The relation between stress and hot tearing is good for most of the sands in Fig. 7—the higher the stress, the greater the degree of hot tearing. But there are some inexplicable variations. These variations are accentuated when two independent variables are compared, as in Figs. 7 and 8. The same stress theories that explain Fig. 7 nicely fall flat in Fig. 8. When pouring

a Balanced BARROW
for Forward-End Dumping!
★ REINFORCED FOR HEAVY-DUTY SERVICE!
This Sterling Wheelbarrow has a reinforced tubular steel frame with special steel nose shoe. Provides perfect balance for forward end dumping and extra strength for heavy duty service. Rugged construction includes V-shaped tray braces and 12-spoked steel wheel. Ideal for wheeling sand, scrap, castings, coal and other heavy bulk materials. Can be furnished with pneumatic or zero pressure wheel. Prompt shipment.
Write for literature.
At Your Service!
Sterling
FOUNDRY EQUIPMENT
STERLING WHEELBARROW COMPANY • MILWAUKEE 14, WIS., U. S. A.
A 5377-½

WANT FASTER, SAFER, CHEAPER MATERIALS-HANDLING?
COMPACT, FAST TRAVELING
KRANE KAR
SWING-BOOM
MOBILE CRANE
CAN SWING IT!
By swinging the boom over the side of gondola cars "KRANE KAR can unload 50 to 55 tons of pig iron and malleable steel in 3 hours," reports a Midwestern foundry. Speeds Unloading into storage piles and bins . . . Loading of scale cars and charging buckets . . . and Handling of big castings through grinding and finishing operations.
1½, 2½, 5 and 10 ton cap.
KRANE KAR Lifts, Transports, and Spots loads of any shape or size up to 10 tons. Using hook or magnet, KRANE KAR safely and efficiently handles Patterns, Flasks, Molds, Cores, Sand Boxes, Rails, Ingots, Billets, Slabs, Scrap . . . and, with a bucket, Coke, Sand, Clay, Coal. Rubber-tired, gas-powered KRANE KAR works indoors/outdoors 24 hours a day!
Thousands of KRANE KARs serving Foundry, Iron and Steel Industry throughout the country. Write for Bull. #89, "How to Cut Handling Costs."
SILENT HOIST & CRANE CO., 885 63rd ST., BROOKLYN 20, N.Y.



This case came to a head in a New York cosmetic plant. Keeping dry powder moving through the bins and drums without costly jam-ups was a real problem.

We're happy to say a CLEVELAND vibrator on each bin and drum was the ideal solution. In no time at all production delays became a thing of the past.

Tell us your materials handling problem, or ask for our detailed literature.

AIR *and* ELECTRIC

2788 Clinton Avenue • Cleveland 13, Ohio

temperature is studied, it is found that stress is diametrically opposed to degree of hot tearing—the higher the load, the less the hot tearing.

So, let's start all over. What we are interested in is hot tears. That's what the cleaning room and the customer are yelling about. Fig. 7 shows conclusively that sand plays a very important part in hot tearing. Of equal importance, Fig. 7 should be the final clincher in eliminating the old misconception that bentonite increases hot tearing and that organic binders decrease hot tearing because they burn out and allow the sand to collapse. To the contrary, bentonite decreases hot tearing tremendously, and the commonly used liquid organic binders increase hot tearing. No one knows exactly why, but the answer probably involves surface density, as discussed previously.

Temperature Affects Tearing

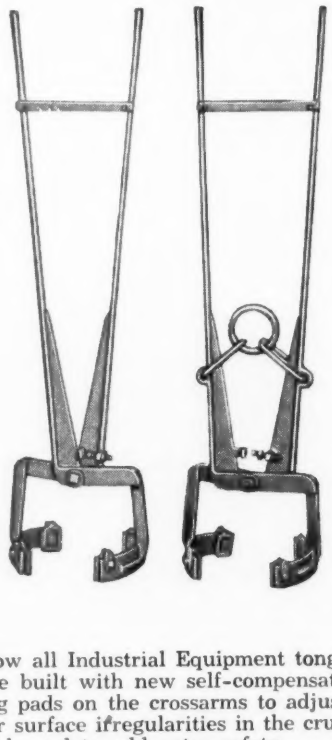
Fig. 8 emphasizes a point that has been checked and rechecked—that pouring temperature greatly affects hot tearing. The lower the pouring temperature is, the fewer hot tears occur, even though stress is greatly increased by lower pouring temperatures. True, the discrepancy between sand and pouring temperature in Figs. 7 and 8 can be explained by theorizing that the strength of metal is higher at low pouring temperatures and therefore can overcome more stress imposed by "hard" sands without rupturing. But what makes the metal stronger at low pouring temperatures? There can be only one answer: Lower temperature gradients in the casting and less pronounced hot spots. It is difficult to transpose temperature gradients into stress. Temperature gradients can be transposed directly into strain and strain concentration. In fact, strength and stress confuse the picture.

Perhaps the direct application of temperature gradients and strain concentration may seem overcomplicated at first, but in reality it is basically simple. Is it too presumptuous to compare this situation to that of the Ptolemaic and Copernican theories of astronomy? The Ptolemaic theory that the sun, stars and planets revolved around the earth seemed simple and straightforward, like the stress theory. However, there were too many exceptions, and a new one cropped up every time a planet was discovered, just as is happening with stress in hot tearing. The Copernican theory simply turned everything around, and although it was

(Advertisement)

SELF ADJUSTING TONG PADS

Important new improvement in crucible tongs by Industrial



Now all Industrial Equipment tongs are built with new self-compensating pads on the crossarms to adjust for surface irregularities in the crucible and to add extra safety.

These pads are shaped to fit the crucible. They are mounted to provide adequate strength yet flexible to permit a full pad contact. This eliminates sharp corners, gouging, crushing, and improper tong support. And it is almost impossible for the crucible to slip.

Next time specify tongs by Industrial. Get self-adjusting pads, screw and locknut adjustment for quick fit, handling ease, extra safety, and your choice of seven different tong types.

Foundry Division

Industrial
EQUIPMENT COMPANY

115 N. Ohio Street
Minster, Ohio

more complicated at first, it fitted more experimental facts and made it unnecessary to pile exception on exception.

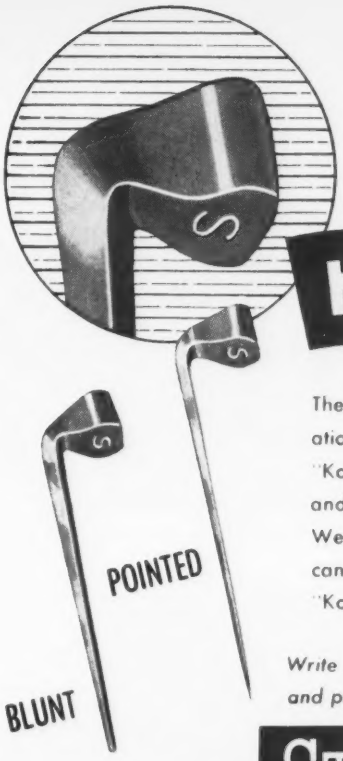
Temperature gradients can be translated directly into strain. Steel contracts close to 0.00001-in./in./°F, and strain is equal to this value. If one part of a casting 10 in. long cools to an average temperature 50°F less than another, there is a contraction strain of 0.005-in. induced in the hotter area. The strain concentration then is determined by the dimensions of this hot spot. Unfortunately, Middleton does not give any temperature gradients for his last test casting, but Middleton and Protheroe[7] do for a similar casting in which the same relation between pouring temperature and hot tearing was found.

Middleton's and Protheroe's particular test casting[7], which was made with 0.25 carbon steel and was 24 in. long with about a 2-in. hot spot, did not hot tear when poured at 2780°F, but did hot tear when poured at 2910°F. The temperature gradient between the contracting member and the hot spot was about 50°F when the casting was poured at 2780°F and about 100°F when it was poured at 2910°F. These are equal to strain concentrations in the hot spot of about 0.006-in./in. (no hot tears) and 0.012 in./in. (hot tears).

Shows Strain Concentration

The data in Fig. 7 also can be converted into strain concentration in a similar manner, as follows. A Middleton casting restrained so that all the contraction was imposed on the spring contracted 0.0055-in. in 55 seconds and tore wide open. Assuming a hot spot of ½-in. in this particular casting, this is equivalent to a strain concentration of 0.011-in./in., about the same as that in previous castings of Middleton and Protheroe, poured at about the same temperature. Middleton's "hardest" core caused a spring deflection of 0.0032 in. This is equivalent to a strain concentration of 0.0064-in./in., still within the range established by the previous test castings[7]. The "softer" sands caused slight hot tearing with spring deflections as low as 0.0005-in., causing strain concentrations of 0.001-in./in. at 2867°F pouring temperature. This strain concentration did not cause hot tearing when similar castings were poured at 2780°F, for these castings did not hot tear with strain concentrations up to 0.006-in./in.

The check between sand and pouring temperature, as they affect hot



STANDARD
does it again!
The KOOLHEAD 90°

The 90° bend under the head simplifies your operation and places the chill where it belongs. The "Koolhead 90°" will perform two duties: (1) a chill and (2) holding the sand on the surface of the mold. We feature clean, bright finished Horse Nails and can furnish the new bent head in any of the various "Koolhead" types.

Write for samples and prices.

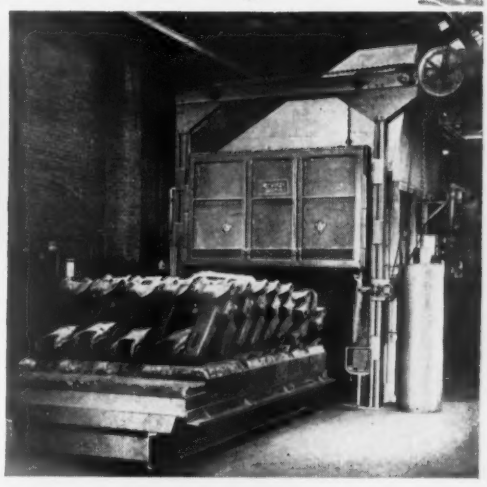
Chill nails for every purpose

CHILL KOOLHEAD NAILS

STANDARD HORSE NAIL CORP.
Since 1872
NEW BRIGHTON, PA.

For Normalizing, Annealing and Heat Treating . . .

JOHNSTON CAR BOTTOM FURNACES



Engineering experience is apparent in the smooth operation of the Johnston Car Bottom Furnace. Roller bearings in car and door hoist shafts, mechanical car seals, and power operated car pullers are just a few of many practical features. Johnston "Reverse Blast" low pressure burners for oil or gas assure clean, economical, efficient heat for annealing, normalizing, and stress relieving.

Write for Bulletin F-240

Johnston Equipment for the Foundry
● Melting Furnaces ● Heating Torches ● Ladle Heaters
● Heat Treating Furnaces ● Burners, Blowers, Controllers
Over Thirty Years Experience in Design and Manufacture.

THE JOHNSTON LINE — SAFETY DEPENDABILITY
JOHNSTON MANUFACTURING CO.
2825 EAST HENNEPIN AVE.
MINNEAPOLIS 13, MINN.
ENGINEERS & MANUFACTURERS OF INDUSTRIAL HEATING EQUIPMENT

* * * This is where PATTERNS of quality and precision are produced for the automotive, aircraft and metalworking fields . . . backed by 35 years of know-how.

* * * These superior PATTERNS are produced under the personal supervision of the two owners and a highly skilled group of employees.

* * * The owners are naturally proud of their reputations. That's your guarantee of quality work and reasonable prices. Let them give you a quotation on your next job—and give you a pleasant surprise.

AUTOMOTIVE PATTERN company

Wood and Metal Patterns

18840 John R. St., Detroit, Michigan

"FALLS BRAND" ALLOYS

AMERICA'S LARGEST PRODUCERS OF ALLOYS

"FALLS" NO. 14 ALLOY

makes

Solid Brass and Bronze Castings

If you make bronze castings to withstand pressure, use "FALLS" NO. 14 ALLOY and save 5 to 50% of the castings that would be rejected on account of leakage after machining.

—reduces casting losses due to porosity in composition, valve metal, bronzes, etc.

—deoxidizes—by reducing Metallic Oxides.

—densifies—by producing a close grained structure.

WRITE FOR COMPLETE DETAILS

CCS

NIAGARA FALLS

Smelting & Refining Division

BUFFALO 23, NEW YORK

tears, is not perfect when based on strain. However, they check within the same order of magnitude and are not too far off when all the guesses that were necessary are considered. At least strain checks better than when these same variables are compared from the standpoint of stress, for with stress there is no relationship at all.

Another method of estimating strain concentration when direct temperature measurements are not possible is by determining the relative cooling rates of the various parts of the casting by surface area-volume calculations. Even this method has many limitations at present because of lack of knowledge of heat flow at points of restricted heat flow, like junctions of sections where hot tears are prone to form. This limitation will be overcome in time as more data become available. In the meantime qualitative estimates, similar to those shown in Fig. 4, can be made for many casting shapes.

Compares Steel and Malleable

Another comparison of stress and strain is possible, this time between two metals, malleable (white) iron and steel. Lange and Heine[8] have investigated the hot tearing characteristics of white iron, using a spring loaded mechanism very similar to that used by Middleton and Protheroe. The most significant difference was in the shape and size of the test casting, which was ½-in. in diam, with a 13/16-in. diam shoulder to form the hot spot, and 9⅝ in. long, whereas the steel specimen was 1 in. square by 24 in.

It is significant that both investigators found a spring that loaded the specimen at a rate of 1 lb per 0.0001-in. deflection to be the most suitable. Middleton and Protheroe found that stiffer springs ruptured their steel castings too soon and at too high temperatures. Lange and Heine found that a weaker spring would not rupture their white iron castings. Both investigators found that their metals hot tore with similarly hindered contractions. Steel ruptured under strain with over-all contractions from 0.0002 to 0.001-in./in. White iron ruptured with over-all contractions between 0.0003 and 0.0015-in./in.

However, the loads (stress) required for rupture were very different. Steel ruptured at loads between 50 and 100 psi unless poured very cold, close to the liquidus temperature. White iron ruptured at much higher loads, 150 to 750 psi. The higher loads were associated

with the lower carbon irons that more closely approach steel in composition. Perhaps this difference in chemical composition or the shape and size of the test specimens account for this difference (300 to 750 per cent) in stress. Practice indicates (and only indicates) that white iron does not hot tear quite as badly as steel and not to the degree predicated by stress.

This difference in stress required for hot tearing is accentuated when superheat is considered. Steel loses strength and resistance to hot tears rapidly with even 50°F superheat, and the highest superheat used by Middleton and Protheroe was 140°F. The white iron castings were poured with 200 to 500°F superheat. This great difference in superheat should decrease the difference in stress required to hot tear the two metals, for there is no reason to believe that superheat should affect white iron any differently than steel.

Brings Two Closer in Line

Re-analysis from the standpoint of strain and strain concentration seems, at least to the writer, to bring the two metals closer in line. The hot spot in Lange's and Heine's test casting is established by thermal studies as ⅜ in. This figure establishes the strain concentration required to hot tear their white iron castings as between 0.0008 and 0.004-in./in., depending primarily on the carbon content. The higher strain concentrations allowable before hot tearing are associated with the lower carbon contents—about 2 per cent. These values correspond to strain concentrations for steel from Middleton's and Protheroe's test castings of 0.001 to 0.013-in./in. The 0.001-in./in. value for steel poured at 140°F superheat is more comparable to that for white irons poured at 200 to 500°F superheat. The average value of allowable strain concentration for white iron is about 200 per cent greater than for steel, and this value seems to check closer to production experience than does stress.

Middleton's data also give a good comparison between the relative importance of two major variables—sand and metal temperature—to hot tears in steel castings. The effect of a number of sands in common use in the country was summarized in Fig. 7. Fig. 8 shows the effect of pouring temperature with one of these sands. All other factors were constant, and a direct comparison such as this is rare in the subject of hot tearing and therefore very important. Middleton also ran the

NOW... get new, reinforced

NU-TEX

DEPRESSED CENTER

DISK WHEELS

FOR FASTER, SMOOTHER CUTTING, roughing and grinding. Special, built-in resiliency provides smooth, cushioned cutting action . . . reduces bouncing . . . holds wheel in close contact with work. Cushioned action distributes pressure evenly . . . makes every inch of surface travel an inch of productive cutting . . . speeds up work with either portable or bench-type grinders.

FOR LONGER LIFE . . . LOWER COSTS. Bonded together with an extremely tough resin for added durability. Textile reinforcement provides maximum on-the-job safety . . . extra protection against breakage . . . longer life under continuous operation.

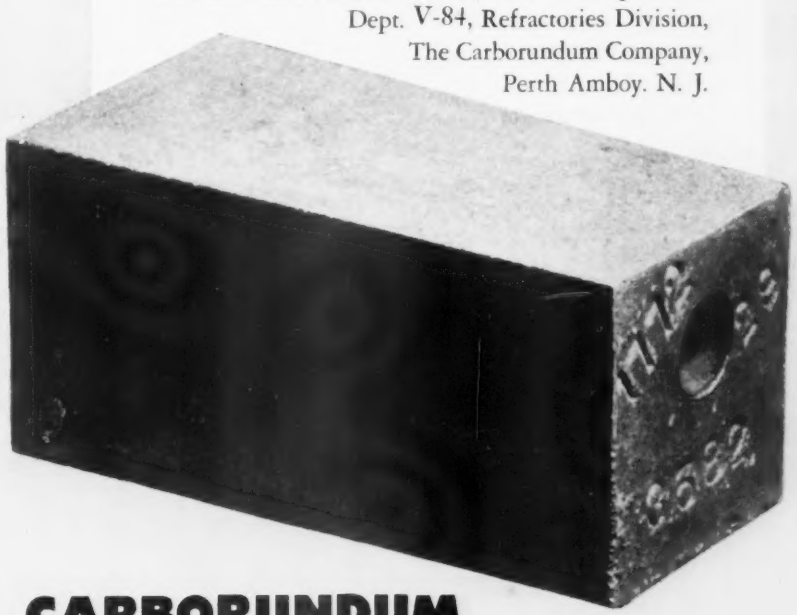
FOR A WIDE SELECTION . . . PROMPT SERVICE. Nu-Tex Depressed Center and Straight Disk Wheels are now available in popular diameters and thicknesses for all types of finishing. Grades range from 0 (hard) to 6 (soft). Write for complete details. Atlantic Abrasive Corp., 534 Pearl Street, South Braintree 85, Mass.

ATLANTIC ABRASIVE CORP.

South Braintree 85, Massachusetts

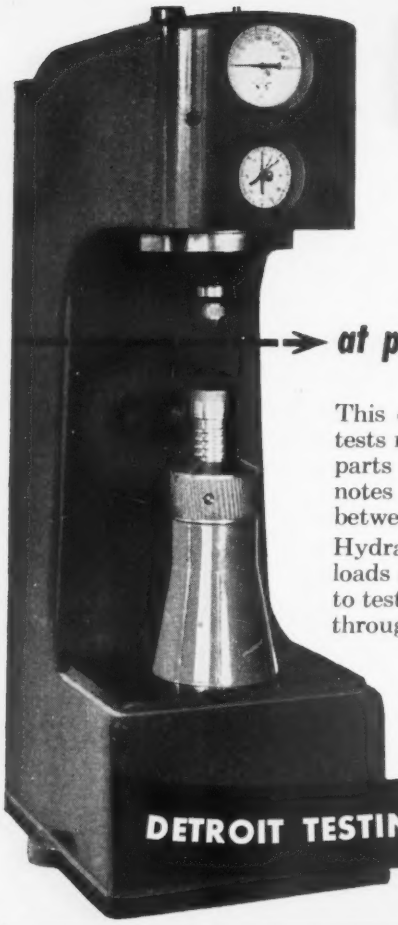
Having slag-hole trouble in your continuous pour cupolas? Try CARBOFRAX silicon carbide blocks. Operators report 20 or more hours' steady service with practically no change in hole size. Order a few of these extra-durable blocks, and make your own comparisons.

Dept. V-84, Refractories Division,
The Carborundum Company,
Perth Amboy. N. J.



CARBORUNDUM
Trade Mark

"Carborundum" and "Carbofrax" are registered trademarks of The Carborundum Co.—World's largest manufacturer of super refractories.



Brinell Testing

→ at production line speeds! →

This direct reading Brinell hardness tester tests round or flat parts *fast*. No grinding of parts is necessary and the operator simply notes that the dial indicator needle falls between pre-set tolerance hands.

Hydraulically applied standard Brinell test loads are used. Foot control allows operator to test parts as quickly as he can move them through the machine.

Write for more information on all our Brinell testing machines.

DETROIT TESTING MACHINE COMPANY

9382 Grinnell Ave., Detroit 13, Mich.

Here's what Industry has to say about REDA melting Furnaces . . .

nothing but praise for the REDA FURNACE . . .

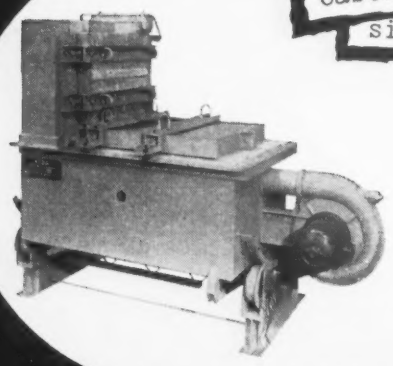
has improved overall foundry operation . . .

doing a wonderful job . . .

much more flexible . . . entirely satisfactory .

castings come cleaner . . .

sincerely recommend it . .



Reda Stack-Loading melting furnaces for ferrous and nonferrous metals have been designed and built by experienced foundrymen for foundrymen everywhere. That is why Reda furnaces provide advantages far beyond those found in other, and more expensive types; that is why, with Reda furnaces there is less down time for maintenance, longer uninterrupted melting runs, and lower melting costs.

Another feature is the Reda Burner arrangement which can operate from oil and gas simultaneously or be switched from one fuel to the other instantly. *Write or phone for complete details.*

REDA FURNACE

REDA PUMP COMPANY • BARTLESVILLE, OKLA.

same pouring temperature experiments with two other sands, one containing 5 per cent bentonite, the other 5 per cent bentonite and 20 per cent silica flour. The water content of the silica flour sand was 4.4 per cent versus 4.8 per cent in the 5 per cent bentonite sand, and these two sands had about the same density. The pouring temperature tests with these two bentonite containing sands were inconclusive. Most did not hot tear at all, the worst only a millimeter or so. The variation probably was within the error of the test.

These tests can mean only one thing—that the sand itself, its collapsibility, density, or what have you, is a more important variable than pouring temperature. The variation due to sand was over 1300 per cent, whereas the effect due to pouring temperature was under 1000 per cent. The extremely low pouring temperatures (2770°) required to obtain this difference cannot be used in most foundries. A more usable value for pouring temperature would be about 300 per cent. More important is that the influence of pouring temperature was only appreciable with the "harder" sands. The "softer" sands overshadowed pouring temperature to the degree that variations in pouring temperature were not significant.

Some foundrymen will say that they have known this all the time. but, then, why has there been an accent on metal? Middleton's data are the first formal proof of this important point that have been published and therefore are important.

It is quite difficult to dispute these data. What we need is work to determine why there is a great difference in sand collapsibility and how to measure it. Instead of looking for a magic wand to stop all hot tears, a new approach to sand collapsibility will pay more real dividends, even though there is little hope for panaceas.

References

1. Bishop, H. F., Ackerlind, C. G., and Pellini, W. S., "Metallurgy and Mechanics of Hot Tearing," *Transactions*, AFS, Vol. 60, pp. 813-833, 1952.
2. Caine, J. B., "Cracks and Hot Tears in Steel Castings," FOUNDRY, June, 1953, p. 120.
3. Brandt, F. A., Bishop, H. F., and Pellini, W. S., "Solidification at Corner and Core Positions," *Transactions*, AFS, Vol. 61, pp. 451-456, 1953.
4. "Report of the Flowability Committee," *Transactions*, AFS, Vol. 61, pp. 156-158, 1953.
5. Brinson, S. W., and Duma, J. A., "Studies on Bore Cracks in Flanged Fittings," *Transactions*, AFS, Vol. 52, pp. 1217-1250, 1945.
6. Middleton, J. M., "The Influence of Molding Materials on the Incidence of Hot Tearing," *Transactions*, AFS, Vol. 61, pp. 167-180, 1953.
7. Middleton, J. M., and Protheroe, H. T., "Hot Tearing of Steel," *Journal*, British Iron & Steel Institute, Vol. 168, pp. 384-400, 1951.
8. Lange, E. A., and Heine, R. W., "A Test for Hot Tearing Tendency," *Transactions*, AFS, Vol. 60, pp. 182-196, 1952.

TRADE PUBLICATIONS

For more details on these items use reply card—page 199

ALUMINUM ALLOY: Foundry Services Inc., 260 Madison Ave., New York 16, N. Y.—Information sheet No. 33 describes aluminum-magnesium alloy ASTM G 10A. Chemical composition, mechanical properties, heat treatment, melting procedures, and molding techniques are discussed.
For More Details Circle No. 141—Page 199

LEAK-PROOF COUPLING: Industrial Sales, Titeflex Inc., Hendee St., Springfield 4, Mass. — Bulletin describes a quick connect-disconnect hose coupling with full swiveling action for water, oil, steam, gas, and chemical lines that is said to provide permanent freedom from leakage.
For More Details Circle No. 142—Page 199

FOUNDRY EQUIPMENT: Sterling Wheelbarrow Co., Milwaukee 14, Wis. — Elaborate Golden Anniversary catalog contains specification, dimension, and capacity information about the company's custom-built and standard flask, heavy-duty flasks, stack molding flasks, flask bars and pins, clamps and clamping bars, bushings, steel core plates and bottom boards, bands and upsets, slag buggies, general and heavy-duty wheelbarrows and trucks, core trucks, and pneumatic and steel wheels.

For More Details Circle No. 143—Page 199

PATTERN DUPLICATION: Cerro De Pasco Corp., 40 Wall St., New York 5, N. Y.—Technical bulletin "Cerro Alloys in the Pattern Shop" contains information about making accurate duplicates of wood patterns in the construction of aluminum matchplates. A method of anchoring phenolic plastic, metal or wood patterns in matchplates also is described.
For More Details Circle No. 144—Page 199

CREEP TESTING MACHINE: Minneapolis-Honeywell Regulator Co., Industrial Division, Wayne & Windrim Aves., Philadelphia 44, Pa.—Instrumentation data sheet 10.18-5 describes operation and instrumentation of an arc-weld creep testing machine, developed for testing special alloy steels used in high temperature service.
For More Details Circle No. 145—Page 199

LADLE COVER: Ironton Fire Brick Co., Ironton, O.—Technical bulletin File C, No. 5 illustrates a method of using an aluminum silicate mineral material with low thermal conductivity properties as a ladle cover by pouring or shoveling on top of the molten metal to form an insulating blanket that is said to prevent temperature drop before pouring.
For More Details Circle No. 146—Page 199

ELECTRICAL INSTRUMENTS: Weston Electrical Instrument Corp., 614 Frelinghuysen Ave., Newark 5, N. J.—Catalog M-2-A provides information on fixed stem and distant reading dial thermometers, temperature and pressure recorders, nonindicating controllers, indicating and recording controllers, as well as accessories and diaphragm motor valves.
For More Details Circle No. 147—Page 199

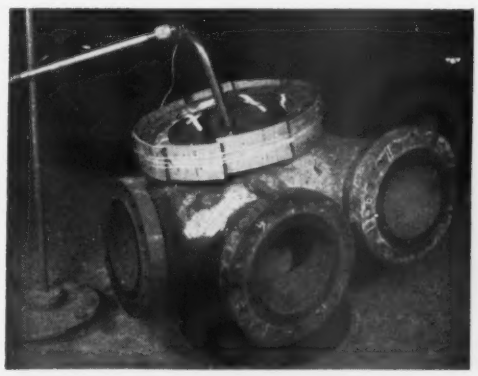
REFRACTORIES: Harbison-Walker Refractories Co., Farmers Bank Bldg., Pittsburgh, Pa.—Technical details, application information and charts on two types of fireclay brick are found in bulletin. These brick are said to offer high refractoriness, high resistance to spalling, high resistance to fluxes, low porosity, stability of volume and strength at high temperatures.
For More Details Circle No. 148—Page 199

VISES: Wilton Tool Mfg. Co., Dept. CR, 925-941 Wrightwood Ave., Chicago 14, Ill.—Several types of vises, clamps and positioning devices are described in general catalog 110.
For More Details Circle No. 149—Page 199

ABRASIVES: Sandusky Abrasive Wheel Co., 623 Ransom St., Kalamazoo, Mich.—Catalog describes rubber and resin-rubber bonded grinding and cut-off wheels, mounted points, and abrasive sticks and blocks for all types of light grinding, polishing, deburring, tool sharpening, and most cut-off operations.
For More Details Circle No. 150—Page 199

MATERIALS HANDLING: Gifford-Wood Co., Hudson, N. Y.—Technical information, deescriptions, illustrations and diagrams of specific industrial applications of a variety of material handling systems are offered in 32-page bulletin No. 400.
For More Details Circle No. 151—Page 199

WELDING SAFETY: Air Reduction Sales Co., Division of Air Reduction Co., 60 East 42nd St., New York 17, N. Y.—Safe practices book-



Radiographing a flange on a heavy steel casting.

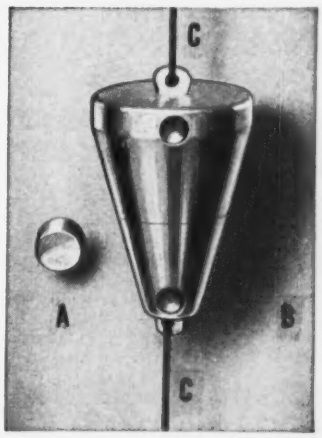
BUY . . . RENT OUR RADIUM . . . OR LEASE RADIOGRAPHY KIT

. . . A Short cut to more productive and economical foundry practice

The use of gamma rays in radiographing steel castings has greatly increased since 1930, when the first commercial use of radiography was introduced. Radium radiography is simple, economical and effective; because it may be rented or leased, the equipment doesn't require a capital investment. It is simple to operate because it doesn't require especially skilled operators. Today radium radiography is rapidly approaching the status of standard equipment in progressive steel foundries. Let us tell you more about the simplicity and economy of radium radiography. Write today for prices, terms and case histories. Your requirements promptly supplied.

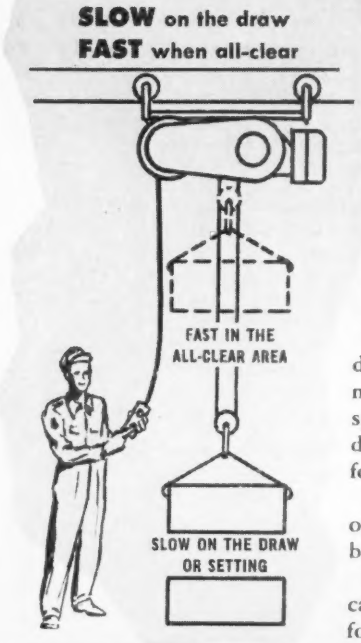
RADIUM CHEMICAL CO., INC.

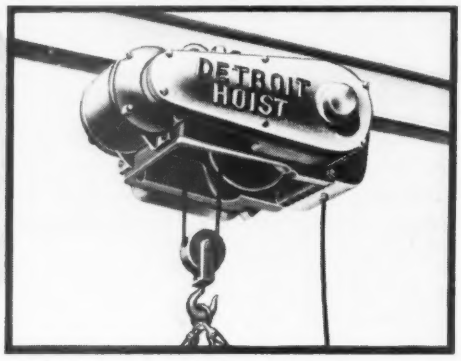
161 East 42nd St., N. Y. Chicago: Marshall Field Annex Bldg. Los Angeles: 3974 Wilshire Blvd.



The apparatus is as simple as
A—small radium capsule
B—cartridge container
C—rigid string support

2 Speed HOISTS for FOUNDRIES





DETROIT, 2 Speed Foundry Hoists have two distinct hoisting and lowering speeds that do not vary with the amount of load—a very slow speed for setting or parting molds or any other delicate operation, and a time-saving, high speed for use in all-clear areas.

The control is simple—one push button operates the two hoisting speeds, a second button operates the lowering speeds.

Detroit, 2 speed hoists available in various capacities, are a boon in foundry work. Ask for additional information on them today.

DETROIT HOIST & MACHINE CO.
Designers & Manufacturers Since 1905
8276 Morrow Street • Detroit 11, Michigan

When You Think of *Aluminum Ingot* THINK of S-G

The sign, S-G, on aluminum ingot means aluminum of uniform quality made to meet the most rigid chemical and physical specifications. Whether it's for permanent mold, sand or die cast you can be sure with S-G ingot.

Our complete modern research and testing laboratories are available to help you secure just the right ingot to meet your needs.

BRASS AND BRONZE INGOT ALSO PRODUCED TO YOUR SPECIFICATIONS

SONKEN-GALAMBA Corporation
MEMBER ALUMINUM RESEARCH INSTITUTE
Riverview at 2nd Street • Kansas City 18, Kansas

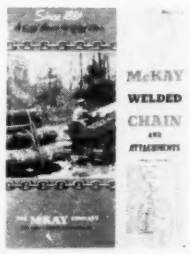
let is designed for welding and cutting operators handling oxyacetylene and arc welding equipment. Booklet details safety cautions and rules for personal safety, the handling and maintenance of cylinders, torches, regulators and hoses. Sketches illustrate safe practices as well as malpractices.

For More Details Circle No. 152—Page 199

METAL POWDER: Easton Metal Powder Co., 233 Broadway, New York. Photographically illustrated bulletin describes company's modern plant and depicts laboratory facilities and the sequence of production operations in the manufacture of a new line of iron powders. The line includes various grades of powder for flame cutting, scarfing, washing, flux coating of welding electrodes, powder metallurgy, electronic and chemical operations.

For More Details Circle No. 153—Page 199

WELDED CHAIN: McKay Co., 326 McKay Bldg., Pittsburgh 22, Pa.—Bulletin B catalogs various types of welded chain as to working load limits, material diameter, link sizes, finishes and packaging. Both fire and electric welded chains of low and high carbon and alloy steel in standard types and sizes are covered. A section is devoted to various repairing links, grab hooks, slip hooks, cold shuts and connecting links generally used to construct special assemblies.



For More Details Circle No. 154—Page 199

NONFERROUS GRINDING: Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6, Minn.—The use of coated abrasive belts and disks for removing nibs, risers, burrs or flashings from nonferrous castings is pointed out in booklet. Also featured is the use of coated abrasives in the finishing of patterns, molds and dies as well as the application of pressure sensitive tapes in nonferrous foundries.

For More Details Circle No. 155—Page 199

CORE PLATES: Johns-Manville, 22 East 40th St., New York 16, N. Y.—Folder presents information on core plates and slip jackets and data on an asbestos form drier developed for use in dielectric and electronic furnaces. Recommendations for use, performance characteristics and illustrations of materials in service are covered.

For More Details Circle No. 156—Page 199

ALLOY SPECIFICATIONS: R. Lavin & Sons Inc., 3426 South Kedzie Ave., Chicago 23, Ill.—Volume 10, No. 1-2 contains nonferrous ingot and casting alloy data in chart form compiled for easy reference. Specification numbers, chemical compositions, physical properties and test bar designs also are given.

For More Details Circle No. 157—Page 199

Step ahead in this five billion dollar market with

Foundry's

PLUS 5 SERVICE

What is PLUS 5? It's your key to more business from foundries. It gives every FOUNDRY advertiser a bonus he can get from no other source. Here is help in analyzing this market—studying sales territories and potentials—planning the sales effort—and creating a constructive promotion program to the 5 billion dollar foundry market. It's time to take a new look at this market—and at the unusual selling aids we have for you. Say PLUS 5 to your FOUNDRY representative and he'll show you this 5-step program designed to move more of your products into foundries.

A Penton Publication

FOUNDRY

more than a magazine... a complete sales development service

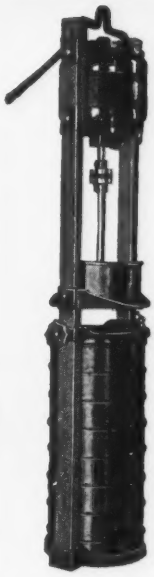
Penton Building, Cleveland 13, Ohio

ROUND... AND ROUND THEY GO...

With a Fast, Smooth Gyratory Motion

COMBS

FOUNDRY RIDDLES

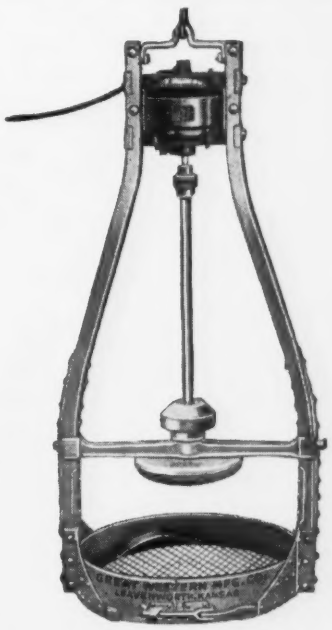


Type "HL" Lab Sifter for sand control $225.00 without sieves

WORLD FAMOUS!

Type "CS" with 24" square screen and automatic discharge $320.00

Type "CR" with 24" sieve $310.00



TYPE "V"

With 20" sieve	$250.00
Also made with 36" sieve	$450.00

All these machines cost less than 1¢ an hour for power. Quickly removable steel rim sieves can be removed, emptied and replaced in seconds. Saves up to 97% of your labor costs. Send for free descriptive folder.

Prompt Delivery From Your Foundry Supply House

GREAT WESTERN MFG. CO.

LEAVENWORTH • KANSAS

TISCO Replacement Blade
Mf'rs. Part No.36473
Tisco Pattern No. 25615

WHEELABRATOR*USERS REPORT: 2 to 5 times longer blade life!

TISCO®
REPLACEMENT BLADES
to fit Wheelabrators*

TISCO Replacement Blade
Mf'rs. Part No. 47130
Tisco Pattern No. 23820

**Names on request

Comparative performances of TISCO Blades		
USER**	TISCO BLADES	COMPETITOR'S
Customer A	78 hours per set	44 hours
Customer B	62 hours per set	30 hours
Customer C	114 hours per set	36 hours
Customer D	101 hours per set	16 hours
Customer E	192 hours per set	38 hours

▶ SAVE money—down time—lost production

Check your present blade-hours against the chart above. Most likely you, too, can increase blade life and reduce maintenance costs by installing TISCO Replacement Blades.

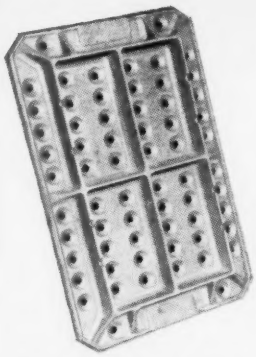
What makes this possible? The specially developed wear-resistant alloy and fabricating methods pioneered by Taylor-Wharton for Wheelabrator* blade service. Blades are heat-treated to a Rockwell C hardness of 65 and Brinell hardness of 700. All fitting dimensions are accurately ground to gauge—wearing surfaces have maximum smoothness—each blade is weighed and balanced in sets.

Order TISCO Blades from your foundry dealer or direct from us. Keep job records—be convinced!

Sold by foundry dealers throughout the United States and Canada. If your dealer has none—write us direct

*Reg. U. S. Pat. Off. by American Wheelabrator & Equipment Corp.

TW Founded 1742
TAYLOR-WHARTON IRON AND STEEL CO.
HIGH BRIDGE 7, NEW JERSEY
Cincinnati, O. Birmingham, Ala. Easton, Pa.



Underside view of the R & J aluminum-cleat bottom board. Both this and the R & J wood-cleat board are used by Zenith Foundry, West Allis, Wisconsin.

And Here's Why Zenith Foundry Co. Uses R & J Aluminum Bottom Boards—

1. No heavier than wood—but won't char, smoulder, or burn like wood.
2. Much cheaper than magnesium—and won't fuse.
3. R & J's are scientifically designed for extra strength, and properly vented for gas release.
4. R & J's are pound for pound less expensive than flimsier competitive brands.
5. R & J's stand up year after year.

R & J Aluminum Bottom Boards can be custom-made to meet YOUR particular requirement or design. For full details—price list—quotations, contact:

R & J Foundry Co. 610 South 94th St. Milwaukee 14, Wis.

COLOR YOUR CORE SANDS

Modern foundries have found it practical to color their various grades of core sands. This eliminates guesswork and assures the proper use of the required type of core sand for the particular job at hand.

Our laboratories have developed a line of special dyes in a range of colors that have been carefully tested and found suitable as well as economical.

Write us for details and samples.

EATON CHEMICAL AND DYESTUFF COMPANY

1490 Franklin Street — Established in the year 1838 — Detroit 7, Michigan

Canadian Branches: Windsor and Toronto

THEY STAND THE HEAT!

Acme

MELTING POTS

DIE CAST POTS

INGOT MOLDS

. . . FOR MELTING NONFERROUS METALS

MADE OF SPECIAL M-HEAT RESISTING IRON • WRITE FOR SCHEDULE OF 40 SIZES

Acme FOUNDRY COMPANY

2502 22nd St. Phone: Tashmoo 5-2404 Detroit 16, Mich.

HEAT OR DRY LADLES the Simple Economical Safe Way

with

HAUCK Portable Venturi High Pressure OIL BURNERS

- 5 times as fast as wood or charcoal.
- Eliminate smoke, ashes, gases.
- Burner lights without preheating.
- Burns fuel oil, kerosene, etc.
- Clean, powerful, instantly adjustable for drying or heating.
- Sizes for all ladles from 100 to 10,000 lbs. and up.
- Single and double burners operating from one fuel tank.

Write for Catalog 1043

HAUCK MANUFACTURING CO.

Oil and Gas Burners for Core Ovens, Annealing Furnaces, Heating and Drying

106 TENTH STREET • BROOKLYN 15, N. Y.

No. 4 DAYTON RING VALVE BENCH RAMMER

MORE POWER—MORE SPEED

You'll get more production with these faster, more powerful rammers and at the same time substantially reduce maintenance costs.

The Valve Units will last for years. The Cylinder Bores and Piston Rods are HARD CHROME PLATED which doubles the life of the Rammer. Many of the largest foundries in the country have already adopted them as standard. Made in six sizes to meet every requirement.

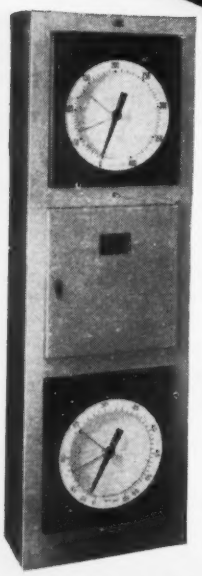
Send for Bulletin 300

DAYTON PNEUMATIC TOOL CO.

Manufacturers of Pneumatic Tools Since 1903

DAYTON, OHIO

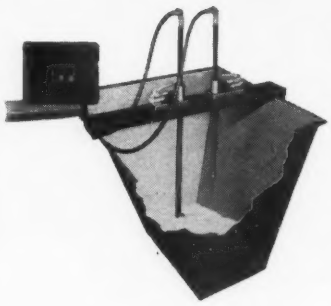
AUTOMATIC SAND TEMPERING



The Automatic Sand Tempering Unit adds the exact amount of tempering water to any type of sand in any type of sand mill.

RESULT Constant Moisture—Saves labor—Improves ease of molding—Saves castings.

AUTOMATIC SAND PLOW



The Hoppertrol Unit automatically raises and lowers the sand plow depending on sand level in center of the bin or hopper.

RESULT Saves labor—Removes men from dusty locations. Sand distribution may be programmed.

HARRY W. Dietert COMPANY

CONTROL EQUIPMENT
SAND · MOLD · MOISTURE
CARBON · SULFUR

9330 ROSELAWN AVE. • DETROIT 4, MICHIGAN

WRITE FOR LITERATURE
OR SALES ENGINEER
WILL CALL ON REQUEST

PHILADELPHIA COKE

PHILADELPHIA COKE COMPANY

4501 Richmond St.

Philadelphia 37, Penna.

PHONE: DELAWARE 6-3100

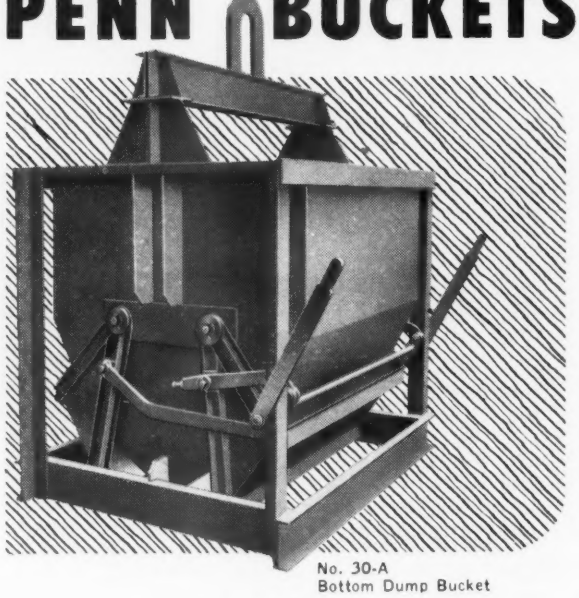
•

Producers of

FOUNDRY · METALLURGICAL

INDUSTRIAL COKE

PENN BUCKETS



No. 30-A
Bottom Dump Bucket

Exclusive design makes this bottom dump bucket easy to operate . . . easy to open. Efficient for foundry use in handling all types of sand, moulding or core, dry or prepared. Can be used with coke, scrap iron and castings also. Sizes 7 to 200 cu. ft.

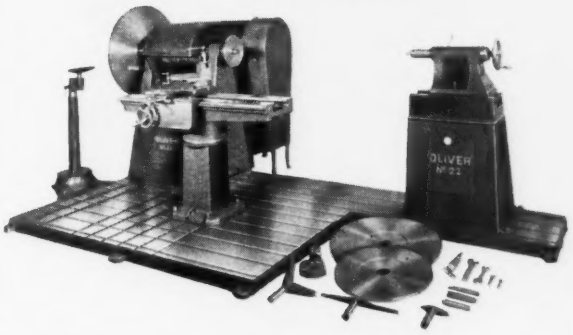
MEMBER FEMA

Write Today for Catalog • Prices Quoted on Application

PENN IRON WORKS, INC.

READING, PENNA.

"Oliver" Lathes are versatile . . . they save time and simplify work on large patterns



The "Oliver" No. 22 Lathe handles a wide range of patterns, or where the patterns are large and heavy like wheels for generators. Movable carriage and tail stock can be quickly located in any position on the T-slot soleplate. Swings 96" over base, 104" at rear of head stock. Turns 6' 6" between centers of standard machine. Has 4-step cone pulley. Speeds: 22 to 948 r.p.m. for D. C. or 30 to 1310 r.p.m. for A. C. Used by leading engineering firms. Write for Bulletin No. 22.

"Oliver" makes a full line of lathes and woodworking machinery for pattern shops

OLIVER MACHINERY COMPANY

Established 1890 **GRAND RAPIDS 2, MICHIGAN**

with

COLUMBIA-SOUTHERN

SODA BRIQUETTES

The size and shape of Columbia-Southern Soda Briquettes have been scientifically designed to do a faster, better desulphurizing job in Blast Furnace and Foundry operations.

The walnut form exposes maximum surface area and it is a known fact that the amount of contact is a highly important factor in determining the percentage of sulphur reduction.

Aside from speedy and efficient desulphurization, Columbia-Southern Soda Briquettes accelerate production, increase fluidity, quicken the release of gases and impurities, allow for automatic slag skimming, and improve the refining value of the iron.

Order your supply today by name "Columbia-Southern Soda Briquettes." Packed in 100 lb. paper bags; easy to handle and store.

COLUMBIA-SOUTHERN CHEMICAL CORPORATION

SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY

ONE GATEWAY CENTER, PITTSBURGH 22, PENNSYLVANIA

District Offices: Boston • Charlotte • Chicago • Cincinnati • Cleveland Dallas • Houston • Minneapolis • New Orleans • New York • Philadelphia Pittsburgh • St. Louis • San Francisco

Quick Clean Release for SHELL MOLDS

IMS

SILICONE BOMB SEPARATOR

SHELL MOLDERS!
CHECK THESE FEATURES

- ✓ Wets and adheres to all metal surfaces.
- ✓ Does *not* affect permeability of shells.
- ✓ Will *not* form carbonaceous deposits.
- ✓ Completely stable at all molding temperatures.

PRICES

Sample Can	$ 2.00
Unbroken dozen	18.00
Unbroken gross	197.40

Minimum Freight Allowed

Further discounts on larger orders.

INJECTION MOLDERS SUPPLY CO.

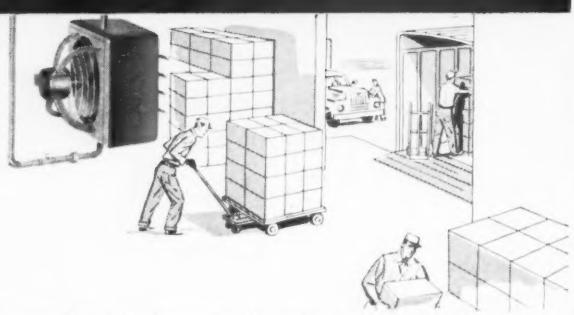
3514 LEE ROAD WYoming 1-1424 CLEVELAND 20, OHIO

job-rated

HERMAN NELSON UNIT HEATERS

BEAUTIFUL ENOUGH FOR THE LOBBY

POWERFUL ENOUGH FOR THE LOADING DOCK



Choose the right heater in the right size from the *job-rated* line of Herman Nelson Horizontal Unit Heaters. Eighteen sizes handle every heating need, all are designed to use either steam or hot water. You get quick heat—no warm up to waste fuel and electric current. Get the best—and most beautiful—get Herman Nelson Unit Heaters. Available also in Vertical, De Luxe, Gas Fired and Industrial models.

Write for descriptive literature.

AAF herman nelson

American Air Filter

COMPANY, INC.

266 Central Avenue, Louisville 8, Ky.

AMERICAN AIR FILTER OF CANADA, LTD.

Montreal, P. Q.

LOAD...

with a model 363

BARBER-GREENE PORTABLE CONVEYOR

UNLOAD at lowest cost

with a

BARBER-GREENE model 358 CAR UNLOADER

see your B-G distributor or write

Barber-Greene

AURORA, ILLINOIS, U. S. A.

HIGH SILICA QUARTZITE PEBBLES

★ ★ ★

R. W. SIDLEY, INC.

THOMPSON, OHIO JEL. 2701

FOUNDRY

EDWIN S. CARMAN, INC.

LEE ROAD AT MAYFIELD

CLEVELAND 18, OHIO

A COMPLETE FOUNDRY SERVICE

MECHANIZATION

EF

GAS, OIL AND ELECTRIC

FURNACES

For all annealing and heat treating requirements

THE ELECTRIC FURNACE CO. ● SALEM, OHIO

Canadian Associates ● CANEFCO LTD. ● Toronto I, Canada

RADIOGRAPHY Co-60 Ir-192

Tracerlab

Cobalt-60 and Iridium-192 RADIOGRAPHY SOURCES

. . . and *all* necessary accessories are available for *low cost* industrial radiography. With the versatility, practicality and portability offered by radioactive sources, even the smallest firm can now afford to radiograph work to PROVE its quality.

NEW LOW PRICES

FREE booklet covers sources, containers, handler, survey and personnel protection instruments. Write TODAY for your copy.

Tracerlab INC.
130 HIGH ST., BOSTON
2295 SAN PABLO AVE., BERKELEY

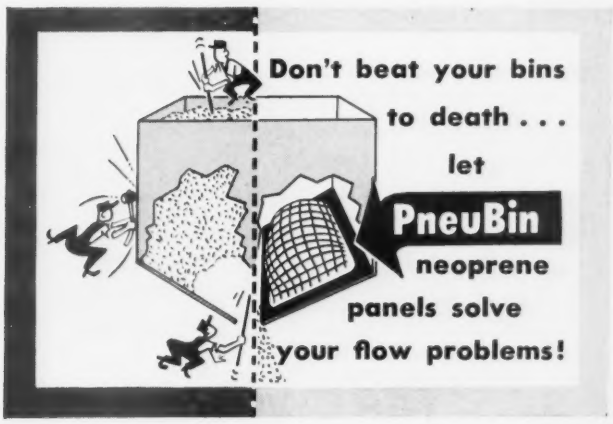
FLOW STOPPAGE COSTS MONEY!

Have you ever figured how much flow stoppage costs you in:

- LOST STORAGE CAPACITY?
- LOST MAN-HOURS?
- LOST PRODUCTION TIME?

PneuBin will solve your flow stoppage problems and help reduce your operating expense. When materials hang-up in your bins and hoppers, PneuBin starts them flowing again. The PneuBin unit consists of a steel-backed neoprene panel, mounted on the inside wall of your bin. By the pneumatic inflation and deflation of the panel, the bin contents are displaced and disturbed to activation. After the diaphragm has collapsed, the air control unit (operating off the regular plant air supply) starts another cycle of inflation and deflation. The process continues automatically at whatever frequency is set on the air controller.

Because the neoprene panel is resistant to oils and most chemicals and is also thick and tough enough to withstand severe abrasive service, PneuBin is applicable to most any bin flow problem.



Sizes: PneuBin panels are available in 14 standard sizes, 4″ to 24″ wide, 6″ to 72″ long. Special sizes can be made if required in quantity.

Send for "Flow Stoppage Report" and free literature. PneuBin engineers will gladly make recommendations, with no obligations on your part.

PneuBin

PneuBin is a product of
GEROTOR MAY CORP.
BALTIMORE 3, MD.

Manufacturers of GEROTOR
HYDRAULIC PUMPS & MOTORS

SUCCESSFUL FOUNDRIES EVERYWHERE

ARE SAVING MONEY WITH

SAFCO Core Oils...

- ★ LOWER CORE AND CASTING LOSSES
- ★ REDUCE SHAKE-OUT TIME AND LABOR
- ★ CUT CLEANING ROOM COSTS
- ★ DECREASE BAKING TIME
- ★ REDUCE CORE GAS AND SMOKE
- ★ ELIMINATE CORE-BOX STICKING

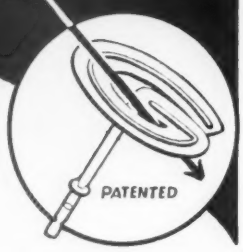
Foundries of every type and size are cutting losses and saving money by putting a SAFCO core oil to work for them. In the comprehensive SAFCO line there is the correct oil to fit your foundry practice and give outstanding performance...

WRITE FOR FREE LITERATURE—TODAY!
OIL PIONEERS FOR OVER 100 YEARS

SWAN-FINCH OIL CORPORATION
205 EAST 42nd STREET · NEW YORK 17, N. Y.
BUFFALO · CHICAGO · DETROIT · MEMPHIS

CLEVELAND Coil Head Shoulder Radiator Chaplet

OPEN HEAD



REDUCES CASTING REJECTS

Core support failures are minimized because you can pack sand better under head and around stem of this chaplet.

CLEVELAND CHAPLET & MFG. CO.
26470 Lakeland Blvd.
Cleveland 22, Ohio

WRITE FOR BULLETIN showing various types of Cleveland Chaplets.

CLEVELAND Chaplets
Since 1890

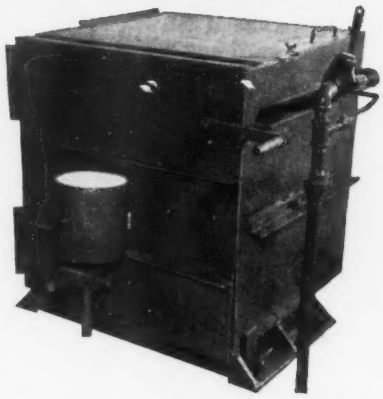
CENTRIFUGALLY CAST

AUTOMOBILE CYLINDER LINERS

DIESEL ENGINE LINERS

BRONZE BUSHINGS

on the new WATER-COOLED Model M-WC
(Illustrated)



Utilizes low cost permanent molds of available steel tubing to produce gray machinable cast iron or bronze bushings.

Water cooled molds can be maintained at either high or low temperature easily. High or limited production in very small space with unskilled labor. Completely safe for workmen. Simple, sturdy equipment. Quick changeover from one mold to another. Practically 100% metal yield of high quality, denser castings. Metal porosity eliminated.

Write for new Bulletin # 153 Illustrating Model M-WC

RESEARCH FACILITIES

We have available an Experimental Foundry equipped for ferrous and non-ferrous melting for both vertical and horizontal centrifugal casting production. Our facilities are available to foundries for research or trial centrifugal castings at low cost.

Centrifugal Casting Machine Co.
P. O. Box 947 Tulsa 1, Okla.

WASH YOUR PLANT WINDOWS AND LET THE SUNSHINE IN! Use a HICKMAN ELECTRIC POWER SCRUBBING BRUSH with direct water and soap supply. Also ideal for washing floors, walls, etc., especially those hard-to-get-at places. Write for circular.

HICKMAN SPECIALTY CO. 96 Buffalo St., Hamburg, N. Y.

COST CONTROL WESTOVER ENGINEERS

Westover ENGINEERS
FOUNDRY MANAGEMENT CONSULTANTS
3110 WEST FOND DU LAC AVE., MILWAUKEE 10, WIS.
There is no better time than NOW to review incentives, methods, scheduling, production control and paperwork processes.

EMPIRE
"THAT GOOD" FOUNDRY COKE

DEBARDELEBEN COAL CORPORATION
2201 First Ave., North • Birmingham 3, Ala.
Phone 3-9135

SHORT CUT TO PROFITS

ohio MAGNETS

WELDED AND BOLTED TYPES • ALL SIZES • COMPLETE CONTROL EQUIPMENT • 28 YEARS A LEADER IN MAGNETIC MATERIALS HANDLING.

THE OHIO ELECTRIC MFG. CO. • 5400 DUNHAM ROAD • CLEVELAND, O.
Associate Member Institute of Scrap Iron and Steel, Inc. A-9095

34 years of fine pattern making

Danko has the background, the professional skill and the facilities to supply all your pattern needs, large or small. Precision performance and prompt service are routine at Danko. Phone or write today.

• Metal or wood match plates • Cope and Drag Machine Plates • Permanent Molds

DANKO PATTERN & MFG. CO., INC. • BALTIMORE 15 • MO. 4-8930

INCREASE PRODUCTION with the
MURPHY PISTOL SPRAYER

OVER A MILLION IN USE . . .

The Hamilton Spray Gun

$15
1/8" and 1/4" pipe size F.O.B. Hamilton, Ohio

For spraying molds and cores with liquids, for cleaning motors and machinery, for laying dust, spraying hot roofing material, and for many other uses. Instant trigger control. Unit shipped complete with 4½ ft. length of suction hose and sinker. Guaranteed.

A squeeze of the trigger and the Murphy Pistol Sprayer instantly shoots a stream of blackening into inner pockets that could never be reached by old-fashioned brush or swab method. Designed by a foundryman, the Murphy Pistol Sprayer is ideal for cleaning permanent molds—aluminum and other metal, and for sand blasting.

Pipe size	1/16"	1/8"	1/4"	3/8"	1/2"
Price F.O.B. Hamilton, O.	$15.00	$15.00	$15.00	$17.50	$22.00

Prices complete with 5 ft. suction hose

EXTRA LONG NOZZLES FOR 3/8" SIZE

This size Sprayer can be furnished with nozzles up to 48" long for spraying ingot molds and hard to reach places . . . also available with curved nozzles up to 15" long.

Long Nozzle Sprayer $22.00

Write for descriptive literature.

$15
1/16" to 1/4" pipe size
Any length nozzle desired

JAS. A. MURPHY & CO. INC.

1421 HIGH STREET • HAMILTON, OHIO

AFTERCOOLERS
SEPARATORS
STRAINERS
TRAPS
SPRAY GUNS
PISTOL SPRAYERS

ANALYSIS OF CASTING DEFECTS

133 pages, illustrated
Price $4.25 Postpaid

To help foundrymen minimize and eliminate defective castings. Thirty-one basic casting defects are listed and described. Defects are defined simply and completely, illustrated by 101 figures collected from foundries of the United States and Canada.

THE PENTON PUBLISHING COMPANY
Book Department
1213 W. 3rd St., Cleveland 13, Ohio

NEWCOMB-DETROIT

PIONEERS IN ENGINEERING, MANUFACTURING & INSTALLING OF

"Uni-Wash"
DUST COLLECTORS
Recirculating Water Type —Compact—Efficient—Proven by Foundry Users

•

"Scroll-Aire" **CORE OVENS**
More Air Circulation— Faster Bake and Better Cores

ESTABLISHED 1912
- **DETROIT DIVISION**
- **GRAND RAPIDS DIVISION**
- **NEWCOMB INDUSTRIES, LTD., WINDSOR DIVISION**

For Bulletins and Quotations, Wire, Write or Call—
NEWCOMB-DETROIT
5755 Russell St., Detroit 11, Mich.
TR 3-2100

TERRE HAUTE
SPECIAL
FOUNDRY COKE

•

A QUALITY PRODUCT

Sold Exclusively by
REPUBLIC COAL & COKE CO.
8 South Michigan Ave., Chicago 3, Illinois
BRANCHES: Peoria • New York • Indianapolis • Milwaukee • Minneapolis • St. Louis
Detroit • Cleveland • Cincinnati
Manufactured at Terre Haute, Indiana by INDIANA GAS & CHEMICAL CORPORATION

Master Power
HARD CHROMED • PORTABLE PNEUMATIC TOOLS

DO MORE WORK AT LESS COST
because they deliver more power per cubic foot of air consumed, are light in weight for easier maneuverability and they retain their new tool power longer.

ARE PREFERRED BY OPERATORS
because they are lighter in weight, better balanced and designed to reduce shock and be free from vibration.

IF YOUR PROBLEM INCLUDES
chipping, ramming, grinding, buffing, sanding or wire brushing, *write us today for full particulars.*

THE MASTER PNEUMATIC TOOL COMPANY, INC.
ORWELL, OHIO • U. S. A.
SALES • SERVICE • STOCK • COAST TO COAST

NEW *Aerovent Mancooler* FANS

for spot cooling of men and machines drying • exhausting • general ventilating

Beat heat and production lags this summer with Aerovent Portable Mancoolers. Pedestal, cradle and wheeled models—all adjustable for 180° directional air discharge. Heavy-duty welded construction. Sizes 24" to 48" for capacities to 40,000 C. F. M.

other models for every air-moving requirement

Certified Ratings

All Aerovent Fans are rated in accordance with the Standard Test Code and U.S.D.C. Comm. Std. CS178-51.

Ask for free folder M-50!

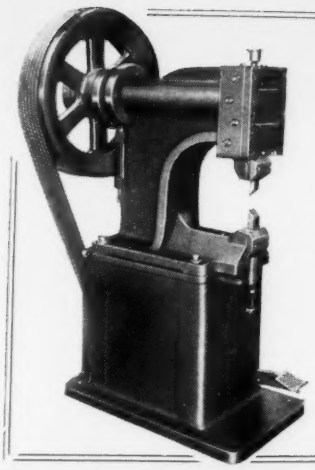
Aerovent Fan Company, Inc.
Ash and Beech Streets *Piqua, Ohio*

CROBAUGH LABORATORIES
Chemists—Metallurgists
FOUNDRY SERVICE
THE FRANK L. CROBAUGH CO.
Phone SUperior 1-4712 CLEVELAND 13, O.

Tamms
AMORPHOUS
CRYSTALLINE
DIATOMACEOUS
SPECIAL SILICAS
SIZE RANGE FROM 100 MESH TO 600 MESH
WRITE FOR PRICES AND SAMPLES—
- All grades of silica ideal for precision casting by the investment molding process
- Will meet the exacting requirements of most precision casting work
- Precision quality to assure uniform casting performance

FINE • PURE • WHITE • UNIFORM
TAMMS INDUSTRIES, INC. Dept. RM-12
228 N. La Salle St. Chicago 1, Ill.

GLOSSARY OF FOUNDRY TERMS
Compiled by Ed Bremer, FOUNDRY Metallurgical Editor
This extensive glossary of foundry terms was compiled from a wide variety of sources. Arranged in handy booklet form, it is a valuable reference for every foundryman. *48 pages.*
$1.00
PENTON PUBLISHING COMPANY, Book Department
1213 West Third St., Cleveland 13, Ohio



MILWAUKEE-TESSMER

Sprue Cutter

for Non-Ferrous Metals

- Fast Clipping Action
- Speeds Production
- Lowers Cost

TWO SIZES

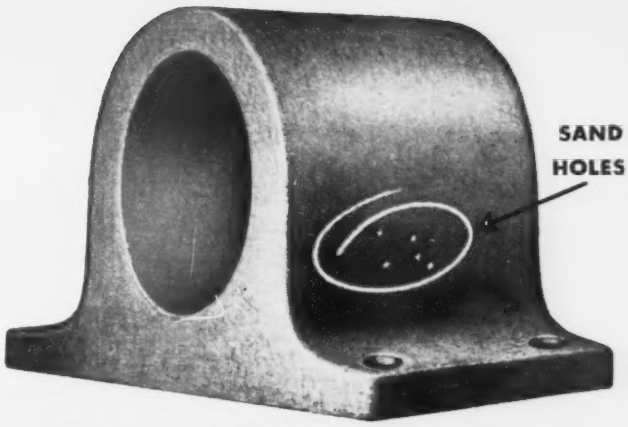
H—¾" square, or ⅞" rd. common brass

I—1¼" square, or 1⅜" rd. common brass

Easy and simple to operate. Any workman can operate at top speed. Simple rugged construction for long life and trouble-free operation.

RICE PUMP AND MACHINE CO.

222 Park Ave., Belgium, Wis.



Save This Casting *with* SMOOTH-ON FOUNDRY CEMENTS

Often a perfectly good casting has blow or sand holes, surface blemishes, or rough and porous areas that detract from its appearance. But there's no reason why it can't *look* as good as it really is.

Simply use Smooth-On Foundry Cement. It goes on easily, quickly . . . hardens rapidly at a predictable rate . . . stays firmly in place.

SHADINGS TO MATCH ANY CASTING

4A • Medium Gray
4AA • Light Gray
4B • Dark Gray
8 • Aluminum
9 • Bronze or Brass

Quality Control That Assures You of Tight, Lasting Repairs

Every lot of Smooth-On Foundry Cement is laboratory tested for setting time, hardness and color. You can be sure of tight, lasting, good looking results every time, provided the directions are followed.

See how much better your castings will look after treatment with Smooth-On, known and used by leading foundries for more than 55 years. Try one or more of these cements at our expense. Write today—on your business letterhead—and we will send you free samples.

SMOOTH-ON MFG. CO., DEPT. 17
570 Communipaw Ave.
Jersey City 4, N. J.

FREE SAMPLES

SO-389

SMOOTH-ON FOUNDRY CEMENTS

WELLMAN *Williams Type*

INSTANT "ON-AND-OFF" SERVICE ANYWHERE

The Wellman "Hook-on", single-line bucket is designed to provide clamshell bucket service at any crane hook where suitable head room and hoist capacity are available.

Hook the yoke over the crane hook and the bucket is ready for work. When the job is finished, take the yoke off the hook and the crane is free for other duties.

Capacities from ⅜ to 2 cubic yards. Write for free bulletin.

THE WELLMAN ENGINEERING CO. 7044 CENTRAL AVE. CLEVELAND 4, OHIO

REECEMELT

An inexpensive process of metal control produces gray and alloyed irons with uniform physical properties consistently day after day. Simple control, not requiring technical background, enables any foundryman to meet specifications on strength, machinability, heat, wear, corrosion resistance, etc. Write today for a REECEMELT summary.

HERBERT A. REECE & ASSOCIATES
960 Union Commerce Bldg., Cleveland 14, O.

HOW TO USE THE CUPOLA

$1.00 Postpaid

NEW 36 PAGE HANDBOOK
by Bernard P. Mulcahy,
Pres. of Fuel Research Lab. Inc.

13 HELPFUL CHAPTERS ON ALL PHASES OF THE CUPOLA. "How To Use The Cupola" . . . . 13 idea-packed chapters based on the practical experience of a man who has devoted his life to foundry fuel and melting problems. It's a mighty useful handbook—a handy source of information which will pay for itself many times over in the months and years ahead.

Book Department
THE PENTON PUBLISHING CO.
1213 W. Third St. Cleveland 13, Ohio

CLASSIFIED ADVERTISING RATES

POSITION WANTED—Minimum advertisement set solid, 30 words or less, $3.00. Additional words 10c each.

ALL OTHERS—"Help Wanted"—"For Sale"—"Wanted"—"Personals"—"Services", etc., minimum advertisement set solid, 30 words or less, $6.00. Additional words 20c each.

NOTE—If replies are to be sent to a box number in care of FOUNDRY, add 6 words to your advertisement for box number and address.

Any advertisement set in all capital letters, add 50% to the above rates.

INCH RATES PER INSERTION

Single Column 2¼" Wide	One Time	Three Times	Six Times	Twelve Times
1 inch	$ 18.00	$ 16.50	$ 15.00	$ 13.50
2 inches	32.50	30.00	27.50	25.00
3 inches	46.50	43.00	39.50	36.00
4 inches	60.00	55.50	51.00	46.50
5 inches	73.00	67.50	62.00	56.50
6 inches	85.50	79 00	72.50	66.00
7 inches	97.50	90.00	82.50	75.00
8 inches	109.00	100.50	92.00	83.50
9 inches	120.00	110.50	101.00	91.50
10 inches (1 col.)	130.50	120.00	109.50	99.00
Half page	195.00	180.00	165.00	150.00
Full page	330.00	300.00	270.00	240.00

Remittance should accompany advertisement when submitted—Cash Discount 2%, 10 days.

Classified Forms Close the 13th of Month Preceding Issue

FOUNDRY

PENTON BUILDING • CLEVELAND 13, OHIO

CLASSIFIED ADVERTISING

Help Wanted

WANTED

FOUNDRY MAINTENANCE

GENERAL FOREMAN

A GRADUATE ELECTRICAL ENGINEER
WITH
EXPERIENCE AS A FOUNDRY MAINTENANCE SUPERVISOR
Experience With
Hydraulic Equipment
Also Desired.

BOX 276
FOUNDRY **CLEVELAND 13, OHIO**

INVESTMENT CASTING METALLURGIST

Wanted by prominent precision casting company located in Midwest. Experience desired in high temperature alloy work or titanium casting. Give details of education and experience.

BOX 260
FOUNDRY **CLEVELAND 13, OHIO**

SAND TECHNICIAN

Familiar with the use of binders and general foundry practice for sales and service in New England States. Excellent opportunity. In reply state full particulars including education and experience. Address: Box 262, FOUNDRY, Cleveland 13, Ohio.

Help Wanted

METALLURGIST, MELTING FOREMAN

A Northern Ohio gray iron foundry melting 50 to 55 tons of gray and alloyed iron daily requires a metallurgist to take charge of melting operations. Only experienced men need apply. Salary and bonus. Write giving age, experience and family status.

BOX 258
FOUNDRY **CLEVELAND 13, OHIO**

FOUNDRY SUPERINTENDENT

For large nonferrous foundry, in New York City, specializing in Aluminum. High salary. Must be in the "know how".

BOX 259
FOUNDRY **CLEVELAND 13, OHIO**

INDUSTRIAL ENGINEER

Position open with midwest gray iron and alloy iron jobbing foundry to assume charge of time study, incentives, and methods engineering. Prefer man with pattern shop experience. If interested state age, detail of experience, and salary desired. Address: Box 273, FOUNDRY, Cleveland 13, Ohio.

PATTERN SHOP SUPERVISOR

Opportunity in Pacific Northwest for aggressive, experienced patternmaker. Shop employs 8 to 10. Production and loose patterns manufactured. Operated by steel and gray iron foundry. Please provide work history and pay expected in first letter. Address: Box 266, FOUNDRY, Cleveland 13, Ohio.

Help Wanted

SUPERINTENDENT

Gray iron foundry with capacity 40 to 50 tons daily, located Lower Michigan. Produces light and heavy castings on jobbing floors, squeezers and rollovers. Excellent opportunity for well trained, capable, aggressive man. Plant well equipped and company strong financially with outstanding earnings record. Expansion program now being planned. Age 50 or under.

BOX 244
FOUNDRY **CLEVELAND 13, OHIO**

PERMANENT MOLD DESIGNER

Must be experienced. State qualifications and salary expected.

BOX 198
FOUNDRY **CLEVELAND 13, OHIO**

PLANNING SUPERVISOR

Steel foundry organization desires services of man with initiative, originality and pattern background. Age 35-45. Wide experience in steel foundry rigging practices required.

BOX 247
FOUNDRY **CLEVELAND 13, OHIO**

Help Wanted

PERMANENT MOLD SUPERINTENDENT

EXCELLENT OPPORTUNITY WITH LARGE, MODERN MIDWESTERN FOUNDRY HAVING UP-TO-DATE EQUIPMENT. YOUR EXPERIENCE SHOULD CONSIST OF PERMANENT MOLD DESIGN OR THE OPERATION OF ALUMINUM JOBBING PRODUCTION. NO OTHER METAL CAST. DIE DESIGN AND GATING KNOWLEDGE ESSENTIAL. PROMOTIONAL OPPORTUNITIES NOT LIMITED. ATTRACTIVE STARTING SALARY. WRITE STATING AGE, EXPERIENCE, REFERENCES AND SALARY DESIRED.

BOX 272
FOUNDRY CLEVELAND 13, OHIO

WANTED

FOUNDRY MAINTENANCE FOREMAN
WITH THE FOLLOWING QUALIFICATIONS:

1. Graduate Electrical Engineer
2. Experience with Hydraulic Equipment
3. Previous Foundry Maintenance Supervisory Experience.

BOX 277
FOUNDRY CLEVELAND 13, OHIO

SALES ENGINEER AND MACHINE DESIGNER

BOTH TO BE FAMILIAR WITH MOLDING MACHINE APPLICATION

A midwest manufacturer has an excellent opportunity for two men with the right qualifications. Give complete abstract of education and experience and state salary desired.

BOX 255
FOUNDRY CLEVELAND 13, OHIO

SALES ENGINEER

We have an opening for a young man with technical education who has had a few years actual experience in the foundry industry. Prefer a graduate engineer. A fine opportunity for an aggressive young man. Apply in writing stating qualifications and salary expected.

W. E. NIEMACKL
MINNEAPOLIS ELECTRIC STEEL CASTINGS COMPANY
3800 N.E. 5th STREET
MINNEAPOLIS 21, MINN.

SALES ENGINEER

Real opportunity working for malleable foundry in Michigan. Must be willing to spend 50% of time traveling. Foundry background necessary requisite. In reply state age, resume of experience, education, and salary desired. Address: Box 253, FOUNDRY, Cleveland 13, Ohio.

STEEL FOUNDRY SUPERINTENDENT

700 ton capacity Foundry in Illinois requires general superintendent for foundry, grinding room and pattern shop. Graduate engineer—age 40 to 45 preferable. Foundry operation experience desired. Give complete history, references and salary expected.

BOX 280
FOUNDRY CLEVELAND 13, OHIO

Positions Wanted

MANAGER OR ASSISTANT TO PRESIDENT

Capable young executive, metallurgical degree. Instrumental in developing latest foundry techniques in basic cupolas, nodular irons, and shell mold methods and processes, all now in successful operation. Extensive foundry background. Cost, quality and production minded. Address: Box 261, FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

FERROUS FOUNDRIES

Technical education and seventeen years' varied experience in foundry practice. Employed now. Desire change for valid reasons. Thoroughly qualified in sand control, iron and steel, green sand and cores, cupola operation and metallurgical control of gray and white irons, plain or alloy. Considerable annual savings possible in most foundries, especially steel, in sand field and closely related details. Available September 1st for position dealing with management. Competent sand control is a specialized field. Most foundries are paying much more in materials wasted, scrap, excessive cleaning costs, through inexperienced and haphazard direction than a competent sand control program costs. Experience in reclaiming sand. Locations favorably regarded include: Midwest, Central Canada, Vancouver, Pacific Northwest, Colorado, San Francisco, Pennsylvania, New York. Address: Box 224, FOUNDRY, Cleveland 13, Ohio.

MANAGER OR SUPERINTENDENT

Thirty-five years' practical experience in foundry, molder eighteen years. Have been foreman, superintendent and general manager. Did consultation work in various foundries. One was losing $7,000 per month when I started, in seven months it was making good money. Ran three largest foundries in St. Louis, largest one in Chicago. Understand gray iron, semi-steel, brass, aluminum. Know how to rig jobs to get best production at lowest cost. Understand running of cupola mix of various metals; estimating jobs from blueprints. Can give best of references. Available immediately. Address: Box 269, FOUNDRY, Cleveland 13, Ohio.

FOUNDRY ENGINEER

"Do you wish to lower your foundry costs? From an executive observation?" If so allow me to analyze your over-all manufacturing set-up. Address: Box 263, FOUNDRY, Cleveland 13, Ohio.

STEEL FOUNDRYMAN

Supervisory capacity with twenty years' experience in all phases steel foundry. Producing steel castings ranging from one pound to three tons. Good knowledge of foundry equipment, foundry methods and mechanized production. Familiar with heading and gating and rigging of patterns for machine production. Also sand control. Married. Age 47. Address: Box 268, FOUNDRY, Cleveland 13, Ohio.

METALLURGIST

B.S. Degree. Age 29. Five years' experience with aluminum casting alloys, including research, production service engineering. Well acquainted with other nonferrous casting alloys. Experience in quality control, radiography, heat treating and physical testing. Desire position in foundry industry or sales service engineering. Excellent record. Address: Box 254, FOUNDRY, Cleveland 13, Ohio.

EXECUTIVE

Experienced in all phases of foundry operation and management with thorough knowledge of each shop process, engineering, metallurgy, cost estimating and accounting, sales and industrial relations. Technical graduate. Excellent recommendations. Address: Box 239, FOUNDRY, Cleveland 13, Ohio.

PERMANENT MOLD EXPERT

Available for consulting or permanent employment. Have designed molds and equipment for several leading producers of copperbase and aluminum castings. Experienced in pressure, gravity, vacuum and centrifugal methods. Experienced patternmaker, tool and moldmaker. Willing to relocate. Address: Box 267, FOUNDRY, Cleveland 13, Ohio.

FOUNDRYMAN

Superintendent or general foreman. Practical man. Twenty-seven years' experience in gray iron and nonferrous jobbing and high production shops. Now employed. Western or central New York preferred but not essential. Address: Box 216, FOUNDRY, Cleveland 13, Ohio.

ALUMINUM PERMANENT MOLD FOUNDRY MANAGER OR SUPERINTENDENT

Capable and qualified manager to direct all phases of this type of foundry operaton. Fifteen years of experience in management, engineering and producton. Prefer West or Central West location. Age 37, married. Address: Box 257, FOUNDRY, Cleveland 13, Ohio.

FOUNDRY EXECUTIVE

Thoroughly experienced in the management of gray iron production or jobbing foundries. Qualified to show you a highly efficient and low cost operation. If you are interested, Address: Box 214, FOUNDRY, Cleveland 13, Ohio.

CLASSIFIED ADVERTISING

Positions Wanted

SOUTH AMERICA

Foundry superintendent at present in charge of machine shop and gray iron foundry of a chemical company, desire to relocate in South America. Experienced also in steel, malleable, nonferrous foundries. Willing to take major part of salary in currency of the country located. Speak Portuguese and Spanish. Age: 40 years. Technical education. Address: Box 189, FOUNDRY, Cleveland 13, Ohio.

FOUNDRYMAN

Would like position with a progressive company as foreman. Experienced in all types of foundry work, gray iron and nonferrous, light to medium production and jobbing. Twenty-seven years foundry experience, ten years as supervisor. Age 47. Address: Box 278, FOUNDRY, Cleveland 13, Ohio.

FOUNDRYMAN

Capable of taking complete charge. Twenty-five year's practical technical experience all phases foundry operations, ferrous or nonferrous. Age 44. Married, will relocate. Address: Box 265, FOUNDRY, Cleveland 13, Ohio.

TECHNICAL MANAGEMENT

Do you need an experienced man to manage your technical department? A graduate engineer with fifteen years foundry experience, eight years university teaching and fifteen years handling casting problems for government is available to organize and manage such a department. Has experience in the positive correction of foundry practices for maximum economy, improving casting designs and layout of facilities for increased production. Address: Box 270, FOUNDRY, Cleveland 13, Ohio.

Representatives Wanted

SALES REPRESENTATIVE WANTED

Well established foundry in upstate New York wants qualified casting salesman. Commission basis. Prefer man with established customer relations. Castings from ounces to five tons. Castings only—rough machined or completely machined.

BOX 228
FOUNDRY CLEVELAND 13, OHIO

OPPORTUNITY

Bright future for right man experienced in selling foundry supplies and equipment. Long established firm in Los Angeles, California. Write full details. Address: Box 225, FOUNDRY, Cleveland 13, Ohio.

REPRESENTATIVES WANTED

Manufacturer's agents and distributors wanted by well established company for binders, facings and chill wash to the foundry industry. Many territories open. Address: Box 264, FOUNDRY, Cleveland 13, Ohio.

Representative Available

REPRESENTATIVE AVAILABLE

Established and reliable manufacturers' representative covering principal manufacturers in Michigan, Ohio and Indiana wishes to represent high production mechanized gray iron foundry. Address: Box 271, FOUNDRY, Cleveland 13, Ohio.

Foundry Work Wanted

LOWEST COST

Top quality guaranteed. Foundry and machine shop work. Low taxes. Low wage scale. Send drawings for prompt low price quotation. Address: AMERICAN FOUNDRY AND MACHINE SHOP, APARTADO 2610, MEXICO CITY, MEXICO.

Employment Service

FOUNDRY PERSONNEL SPECIALISTS
National Placement and Procurement of

GENERAL AND PLANT MANAGERS, PLANT SUPERINTENDENTS, FOREMEN—ALL DEPARTMENTS, METALLURGISTS, ENGINEERS, CONTROLLERS, ACCOUNTANTS, SALESMEN, SALES MANAGERS, PERSONNEL DIRECTORS, PURCHASING AGENTS.

Confidential Inquiries Invited
From Employers and Qualified Applicants.

For Fast Competent Assistance Contact

JOHN COPE, DIRECTOR — **37 S. WABASH, CHICAGO 3, ILL.**
IMPERIAL PERSONNEL — **FRANKLIN 2-4233**

Wanted-To-Buy

WANTED
MAGNESIUM CHIPS

We pay top prices for Magnesium Chips, Borings, Cuttings, Shavings, etc.

STANDARD MAGNESIUM CORP.
7600 EAST 41st STREET
TULSA, OKLAHOMA

WANTED

Overhead sand system with mullers, molders chutes and mold conveyors. Must be in excellent condition and priced right. Also tower core oven.

BOX 275
FOUNDRY — **CLEVELAND 13, OHIO**

WANTED

27 x 36, or smaller, Wheelabrator and Dust Arrestor.

MARLBOROUGH FOUNDRY, INC.
555 MAPLE STREET
MARLBOROUGH, MASS.

MIXERS WANTED
Used Simpson Intensive Sand Mixers. State size, condition and lowest cash price or immediate acceptance. Address Box 578, FOUNDRY, Cleveland 13, Ohio.

MACHINERY WANTED

Induction Furnaces, Screens, Simpson Mixers, Riehle Compression Testing Machines, Pulverizers, Grinders, Conveyors. Address: CONDENSER SERVICE & ENGINEERING CO., INC., HOBOKEN, NEW JERSEY, BA 7-0600.

WANTED

5 x 6, 6 x 6, 6 x 7 or 5 x 7, 5000 lb. safe load capacity late model used Shakeout. Address: SAVANNAH MACHINE AND FOUNDRY CO., P. O. BOX 590, SAVANNAH, GEORGIA.

Foundries For Sale

FOUNDRY FOR SALE

Small foundry, machine and wood working plant located 11 miles from Massena, New York, the center of the Seaway and Power Development.

P. E. KENNEHAN'S SON & CO., INC.
BRASHER FALLS, NEW YORK

FOUNDRY FOR SALE

Gray iron—modern—late equipment. Pouring 40 tons. Includes porcelain enamel furnace. Floor space 48,000 sq. ft., 3½ acres, 360 ft. R.R. siding. Central Pennsylvania, excellent labor conditions.

PRICE: $125,000
BOX 279
FOUNDRY — **CLEVELAND 13, OHIO**

FOR SALE

Brick and steel foundry, Southern Illinois, 160 x 320 feet, overhead monorail, water transportation available. Ideal for mechanized operation, contains equipment. Address: Box 200, FOUNDRY, Cleveland 13, Ohio.

Foundries For Sale

FOR SALE

Fully equipped gray iron foundry in excellent labor area, Southern Massachusetts. Fine roll-overs, pin lifts and jolt squeezers, 36 x 42 Wheelabrator tumblast tumbling barrels and good core ovens. 16,000 square feet. Excellent proposition for quick sale.

BOX 274
FOUNDRY — **CLEVELAND 13, OHIO**

FOUNDRY FOR SALE

Nonferrous foundry well established. Will sell half interest because of health. Sales 1953, $236,000, profitable. Rent $310.00 for 12,000 sq. ft., New York City area. Also specialize in Kirksite dies. Address: **V. J. FRANCIONE, 1443-79th St., BROOKLYN 28, NEW YORK.**

FOR SALE

Foundry, machine shop, sheet metal shop and residence. Will sacrifice for $21,000.00 cash. Reason for selling other interests. Write Box 1442, Minot, North Dakota or phone 48-140.

Opportunity

BRAINS FOR SALE

$500.00 per year.

To make superior castings, contact:

BOX 234
FOUNDRY — **CLEVELAND 13, OHIO**

Engineering Service

FOUNDRY TECHNICAL SERVICE
FOR
STEEL, MALLEABLE, AND GRAY IRON FOUNDRIES

Expert assistance is available to establish sound, stable foundry practices in all production departments. To promote reduction in scrap and cost; to better quality of casting thereby giving improved service to the customers.

INQUIRIES ARE SOLICITED.

HERBERT F. MILLER, CONSULTANT
FOUNDRY ENGINEERING SERVICE
718 WEST SECOND STREET
MARION, INDIANA

For Sale

FOR SALE
DETROIT ELECTRIC FURNACE

Type AA of 1,200 lb. cold metal or 2,600 lb. hot metal capacity, complete with mechanical and electrical equipment for melting and rocking, including oil filled transformer of 11,000 v. primary and 125 v. secondary. Presently crated but available for inspection on 48 hours notice. Ideal for high test cast irons, brasses or bronzes. Price: $9,500.00. Address: HOPE ELECTRICAL PRODUCTS CO., 338 WILSON AVENUE, NEWARK 5, N. J.

FOR SALE

1—Whiting #3½ Cupola, 51" O.D. shell lines down to 36" I.D. Complete with blower and motor. In good condition. Price $1,500.00 f.o.b. Alpena, Michigan. Address THUNDER BAY MFG. CORPORATION, P.O. BOX 317, ALPENA, MICHIGAN.

HAVE YOU EVER NOTICED the numerous types of headings under which classified ads are listed? Whether interested in obtaining qualified personnel, selling used machinery, wanting to buy equipment, or are yourself looking for a better position, you should seriously consider advertising in the classified section of FOUNDRY MAGAZINE.

•

FOUNDRY has 45,000 readers which cover the entire foundry industry. That means that for a nominal sum you get the widest possible coverage of the industry and your advertisement reaches "just the right people".

•

The Classified Staff is equipped to handle all details in the placement of your ad.

CLASSIFIED ADVERTISING DEPT.
FOUNDRY
CLEVELAND 13, OHIO

UNIVERSAL

Partial Listing of America's
LARGEST STOCK of GUARANTEED
EQUIPMENT

FURNACES

1—60# **DETROIT** Arc Rocker
1—350# **DETROIT** Arc Rocker
4—Large **HEAT TREAT** Furnaces
ARC MELTING FURNACES, 60# to 15 tons
3—**AJAX-TAMA-WYATT** 333 KW for Alum.

1,000 LB. MOORE SIZE S
LECTROMELT—COMPLETE

5—**HAUSFELD TILTING,** various cap.
2—**FISHER TILTING,** 225 and 400# crucibles
5—**MONARCH** Barrel Type Tilting
1—**AJAX** 50 KW, 3000 cyc. induction
2—**AJAX** 35 KW high frequency melting
1—**FISHER** 1700# MNP Gas Fired—never used.

GUARANTEED EQUIPMENT

1—**WHITING** Cupola #6 w/vert. Skip Hoist and Blower.
2—**WHITING** #8 Cupolas
1—**B & P SPEEDMULLOR,** #60 with **SKIP**
1—**SIMPSON MULLER,** #3 with **SKIP**
2—**CLEARFIELD MIXERS,** #610 and #920
1—**WHEELABRATOR** 27 x 36" with **SKIP HOIST** and Dust Collector, Excellent Cond.
1—**CHAMPION CORE BLOWER,** CB 400
1—**TROPENAS STEEL CONVERTER,** 2 Ton Side Blow, Complete with Blower

3—**CLARK** fork lift **TRUCKS** 108" lift —2,000 and 3,000#

4—**AMERICAN SAND CUTTERS,** All sizes
1—**HEWITT-ROBINS** Apron Type Conveyor
2—**SIMPLICITY SHAKE-OUTS,** 4' x 8'
9—**CORE OVENS,** gas & electric, all types
NUMBER OF MAGNETIC SEPARATORS
1—**WHITING SKIP CHARGER** with Loader and 2,000 lb. **KRON** Scale
1—**WHITING #8A KATHABAR,** Cupola Hot Blast
10—**GRINDERS,** double end, 5 to 20 HP
1—**HOWE** electric **WEIGHOGRAPH** Scale
2,000 FT. Foundry Type **ROLLER CONVEYOR**
1—**LINK BELT REVIVIFIER**
1—40 HP Sullivan **AIR COMPRESSOR**

B & P MOTIVE SAND SLINGER
19" HEAD

2—**HOUGH PAYLOADERS** 1,000 lb. cap.
9—**SAND BELT CONVEYORS** 2—**ELEVATORS**
CENTRIFUGAL BLOWERS, 1 to 85 HP
1—**DEWALT ABRASIVE CUT-OFF,** 10 HP
ROYERS & SCREENERATORS, All Sizes

MOLDING MACHINES

1—**JOHNSTON & JENNINGS** 610 Rollover
2—**JOHNSTON & JENNINGS** #2 Jolt Squeeze Strippers
4—**OSBORN** #710 Jolt Strippers
1—**OSBORN** 444 Jolt Rollover
1—**DAVENPORT** 28A Rollover

12 SPO 110J JOLT SQUEEZERS

4—**HERMAN ROLLOVERS,** 60 x 80, 40 x 60, 144 x 96

Over 50 others: **MILWAUKEE, INTERNATIONAL, TABOR,** All types and sizes, rebuilt and guaranteed

COMPLETE STOCK OF TESTING MACHINES, LAB EQUIPMENT, CORE BLOWERS, LADLES AND OVER 250 TONS OF STEEL FLASKS

UNIVERSAL

MACHINERY AND EQUIPMENT CO.
320 E. BROAD ST.
SHILLINGTON, READING, PENNSYLVANIA
PHONE: READING 7-1321

For Sale

BUY—TRADE—SELL

SPECIAL

48 x 42 Wheelabrator Tumblast $2,500.00
Small down payment—2 years to pay

27 x 36 Tumblast New Steel Belt (Never Used) $2,700.00

#2 Wheelabrator Multi Table 8' Diameter. A beauty, used very little, can be seen in operation $3,500.00

Pangborn Vapor Blast, good condition...$750.00

Also
Hand Cabinets, Pressure Tanks, Blowers, Dust Collectors, Motors. All types and sizes.

If interested in trading any of the above for your present equipment, Please Call or Write:

DIAMOND SAND BLAST, INC.
5654 W. JEFFERSON
DETROIT 9, MICHIGAN
PHONE: VINEWOOD 3-6750

FOR SALE

Wheelabrator Multi-Table No. 3 with 4-48" Multi-Tables, dust collector, complete.$4250.00
Osborn Jolt Rollover Draw Molding Machine, size of table 57 x 64", model 405-1....$1750.00
26—Osborn Molding Machines, Jolt Rollover Table 18" x 24", No. 2047-4 .....$325.00
25—Tabor Molding Machines, 10" squeeze.$115.00
24—SPO 110-J Squeeze Jolt Rollover, cantilever type $225.00
Beardsley & Piper #30 speed muller with skip hoist $2150.00
Beardsley & Piper #40 speed muller....$1700.00
Jeffrey Sanditioner, capacity 10-15 tons per hour $350.00
Beardsley & Piper Screenarator, Type M..$450.00
Royer Sanditioner, junior type.....$170.00
2—Osborn Molding Machines, tables 30" x 22", power rollover $175.00
Simpson No. 0 Muller $675.00
Tabor Molding Machine table 24", power rollover $150.00
10—Pangborn 3CD1 Dust Collector, complete $550.00
American Dust Tube No. 185, capacity 12250 cloth area $900.00
American No. 35 Dust Tube, complete, 810 cloth area $450.00
American Rotoclone, Type N-WET sludge, 2500 CFM $500.00
American Wheelabrator Skip Hoist Loader.... .....$325.00

M. ELSTEIN
370 E. HOUSTON ST.
NEW YORK 2, NEW YORK
CANAL 8-4517

FOR SALE

DIELECTRIC CORE OVENS—Model 900A and Model 1800A; Conveyor Type—1949
Osborn Core Blowers—Models 91, 94 and 193
Herman Jar Rollover & Pattern Draw; 1944; 48" x 144"; 10,000# Series
Int'l. JDP Pattern Draw; 600 lb; 8" draw
Int'l. LP6 Jolt Squeeze Pin Lifts
#2047 Osborn Jolt Rollovers
#918 Johnston & Jennings Molding Machine
#601, #602, #605 Osborn Jolt Rollovers
#275J Osborn Jolt Squeezers
8' Pangborn Tableblast
48" x 48" American Wheelabrator—Tumblast
Marschke Swing Frame Grinders—10 HP & 15 HP

FOR THE BEST DEAL CALL
BALCHER MACHINERY COMPANY
6020 EUCLID AVENUE
CLEVELAND 3, OHIO
TELEPHONE: EXPRESS 1-6909

FOR SALE

1—American Wheelabrator Tumblast machine, size 48" x 72" complete with skip loader. This machine is like new, operated less than 200 hours.

WILLIAM D. CASHEL
761 CLEMENTINA ST.
SAN FRANCISCO, CALIF.

FOR SALE

Cupola Blower. 1 Spencer Turbine Co. Turbo-Compressor 9000 C.F.M. at 24 ounces pressure. Direct motor drive. Westinghouse Electric and Manufacturing Co. 100 H.P. ball bearing induction motor, 1750 R.P.M. 220 volts, 3 phase, 60 cycles, first class condition. Price $3,000.00. Address: FERRO MACHINE & FOUNDRY, INC., 3155 EAST 66th STREET, CLEVELAND 27, OHIO.

CLASSIFIED ADVERTISING

For Sale

FOR SALE

MOLDING MACHINES
1—Plain jolt machine, 60" x 72" table, 16" cylinder.
1—#276 PJ Osborn jolt squeezer.
2—No. 275 Osborn jolt squeezers.
2—SPO #611B Stationary Oscillating Jolt Squeeze Strippers.
1—#610 Johnston & Jennings Air Jolt Rollover Draw Portable 24 x 30 table.
1—Tabor 36 x 50 table Air Jolt Rollover Draw, 3000# capacity.
BLOWERS FOR CUPOLAS AND FURNACES
2—15 HP Spencer-Turbine 2250 CFM at 16 oz.
2—#7½ Roots rotary blowers—27 x 81—14000 CFM.
1—Connersville rotary blower 22 x 66 45 cu. ft. per revolution 9000 CFM.
Maxon-Premix Blowers for Gas ¼ to 1 HP.
2—5 HP 20-oz. Spencer Turbine Blowers.
2—2 HP 20-oz. Spencer Turbine Blowers.
METAL MELTING EQUIPMENT
1—1000# open flame brass melting furnaces, gas fired.
1—MNP Fisher Tilting Al. Furnace 600# cap. gas fired.
1—550# Reda Furnace, nonferrous or iron—oil or gas.
1—Hausfeld Stationary Brass, oil or gas burner, 200# cap.
1—Hausfeld Tilting crucible, gas, 250# Al Cap.
1—Hausfeld 2000# aluminum capacity furnace, barrel type, open flame, oil fired.
New 32" to 41" dia. shell cupolas made to order.
New 1000 lb. aluminum cap. tilting crucible furnaces to specifications.
MISCELLANEOUS
1—Ruemelin cabinet style sand blast room. 7' x 7' x 5' with pres. generator.
1—15 HP Gardner Denver air cooled compressor unit.
1—Stoney crane type shakeout.
1—NC-4 Royer sand separator.
1—#1 Demmler core blower.
1—#16 Roto-clone unit complete.
1—McLeod Small Sand Blast Barrel 24 x 24.
1—30 x 48 tumbling mill.
1—36 x 48 tumbling mill.
Complete stock of rebuilt mill and dust exhaust blowers.

CLIFTON MACHINERY COMPANY
1023 W. SIXTH ST. CINCINNATI 3, OHIO

HEAT TREAT FURNACES

EFCO 36" wide cast link belt hardening furnace. 3 zone. Direct gas fired. Cap. 1200 lb. per hr. Complete with controls and conveyorized quench setup, plus spare parts.
Despatch recirculating continuous draw furnace. 36" wide belt, 35' heating chamber. Gas fired. 1250° F. Complete with controls.
Lindberg Eng. type 729684-EH12 recirculating box. 1250° F. 180 KW.
Lindberg Pit gas-fired cyclone. 48" diameter by 48" deep, with basket and smoke exhauster.
These items are complete and in excellent condition. Other makes, types and sizes available.

PAPESCH & KOLSTAD, INC.
10707 CAPITAL AVENUE
OAK PARK (DETROIT 37) MICHIGAN
LINCOLN 1-1100

FOR SALE

1—Tinius Olsen 100,000# Universal Compression Testing Machine
1—Magnaflux Demagnetizing Unit
Simpson Sand Mixers 18" dia. Laboratory #0, #1, #1½, #2, #3
Miscellaneous: Screens, Pulverizers, Grinders, Conveyors—all types, Tyler Rotap Screens, etc.

OUR 37TH YEAR
CONSOLIDATED PRODUCTS CO., INC.
66 BLOOMFIELD STREET
HOBOKEN, NEW JERSEY
HO 3-4425 N.Y. TEL. BA 7-0600

CARBON & GRAPHITE
Blocks—Plates—Rounds
MOTOR AND GENERATOR BRUSHES
of all types. Original equipment and replacement. Quick delivery from stock. Substantial savings.

BECKER BROS. CARBON CO.
BASIC MANUFACTURERS SINCE 1890.
3448 S. LARAMIE CICERO 50, ILLINOIS
BIshop 2-1260

FOR SALE

CONVEYORS

1—Link-Belt Roller Type Power Mold Conveyor, 27'0" x 70'6" centers, 35 cars 38" x 72".

1—Pigmold Conveyor, 64' sprocket centers, Link-Belt, complete with drive 220/440/-3/60.

CORE BLOWERS

DEMMLER

1—#1—weight of core up to 10 lbs.
1—#2K—weight of core up to 25 lbs.
1—#3E—weight of core up to 35 lbs.
1—SB-7 International
1—CB-18 Champion.

OSBORN

10—#92—weight of core up to 35 lbs.
1—#194-1—weight of core up to 100 lbs.

CORE-OVENS

1—2 Door Coleman, two rack type, gas and oil firing combination recirculating. All controls. Overall 14'10" x 15'8".

1—2 Door Despatch, recirculating, gas and oil fired. Doors 6'8" x 6'8". 16'0" x 16'0" overall. All controls.

FURNACES AND BLOWERS

FURNACES:
Stroman
2—220/225 NP hydraulic tilt, with blowers.
1—#14 Non-tilt.
Campbell-Hausfeld
1—#40 Crucible Non-tilt.
2—2000# IPNT electric tilting—2 burner gas or oil.

HEAT TREATING:
Lindberg
1—48" x 60" 1400° 90 KW 230V. w/5 H.P. Blower.
G. E.
1—30" x 42" 1800° 37 KW 220V. 1 ph. 168 Amps.

FURNACE BLOWERS:
1—3 H.P. 220/440/3/60. 300 CFM 16 oz. pressure.
1—2 H.P. 220/440/3/60. 260 CFM 16 oz. pressure.

CUPOLA BLOWERS:
1—Spencer Turbine. 50 H.P., 220/440/3/-60. 1950 CFM, 24 oz. pressure.
1—North American, 20 H.P., 220/440/3/-60. 6750 CFM, 16 oz. pressure.
1—Piqua Size 5½, with 30 H.P. 220/3/60 motor.

GRINDING EQUIPMENT

2—Fin Cleaning Machines for cylinder heads—Ireland.
1—#230 Gardner double end disc grinder, 36" wheels, V-belt driven.
1—#6 Cheesly disc grinder dir. connected 18" wheel.
1—10 H.P. Black & Decker direct drive double end grinder, 20" x 3" wheels, 220/440/3/60.
3—5 H.P. Safety Emery Wheel Co. belt driven double end grinders 18" x 3" wheel, 220V. 3/60.
1—7½ H.P. Universal Swing Grinder, 220/440/3/60.
2—#24 Gardner Horizontal Disc Grinder, 54" dia., 20 H.P., 220/440/3/60.
1—Standard dble end disc grinder 26" wheels. 10 H.P. 220/3/60.

MOLDING MACHINES

JOLT ROLLOVER AND PATTERN DRAW:
Davenport
2—SA-28, 1500 lbs. jolt, 12" draw, 30" x 40" table, 1 w/air clamps.
1—SA-34, 2500 lbs. jolt, 15" draw, 34" x 48" table.
Herman
1—Pit-type, 6000 lbs. jolt, 42" x 60" table.
1—Pit-type, 9400 lbs. jolt, 40" x 84" table.
1—Pit-type, 10,000 lbs. jolt, 72" x 12'0" table.
Johnson & Jennings
1—#918, 18" draw, 2000# jolt, 44" x 54" table.
Osborn
2—Model 405-95, 3500 lbs. jolt, 26" draw, 40" x 60" table.
7—Model 601, 900 lbs. jolt, 10" draw, 24" x 30" flask max.
11—Model 2047, 8" draw, 21¼" x 22¼" core box.
1—Model 422 w/swing out table.
SPO
1—#9336, 800# jolt, 9½ draw, 22" x 28" table.
Tabor
2—22" x 32" Table, 600 lbs. jolt, 10" draw, with air clamps.

JOLT SQUEEZE PIN LIFT:
International
1—LJSK Hand Lever Lift, 18" x 24" Table, 12" squeeze cyl.
Milwaukee
2—196 Roll-on, Roll-off, 3000# jolt, 19" squeeze cyl., 20" x 30" table, 10" draw.
2—814-P Stationary, 8" draw, 700# jolt, 14" squeeze cyl.

JOLT SQUEEZER:
Haynes
Johnston & Jennings, 512-P "Jack Rabbitt."
Milwaukee
Modern
Osborn—275-J, 210-PJ
Spo—110J
Tabor

JOLT STRIPPER:
Davenport
1—34AJS, 2500# jolt, 12" draw, 36" x 46" table.
International
1—JFL, Foot Lever Lift, 3" draw, 600# jolt.
Osborn
1—559HR, 1200# jolt, 6" draw, 25" x 30" table.
Herman
2—40" x 60" table 6000# jolt.

ROCKOVER AND DRAW:
International
4—"R" hand ram, hand rollover, 8" x 10" draw.
Modern
2—Air jolt, hand rollover.
Osborn
1—147-1, 20" x 60" core box max.
1—146, 24" x 32" core box max.
Champion
4—Type W 22" hand rollover, 12" draw.
1—Type W 16" hand rollover, 8" draw.
Pushoff
4—Champion Pushoff 38" x 40"—10" draw.
1—Osborn Pushoff 3' x 16'.
Plain Jolt
1—Osborn No. 98, 220# jolt, 12" x 12" table.
Tabor Model B-4, 700# jolt, 18" x 24" table.

SAND SLINGERS

2—16" head Beardsley-Piper Stationary, 1200 RPM, 10 H.P., 220/440/3/60.

SHAKE-OUTS

Robbins
1—4'x6', 8000 lbs. capacity, "Floatex".
1—4'x10', 12,000 lbs. capacity with 7½ H.P., 220/440/3/60 motor.
Simplicity
1—4'x6' Model D, 16,000 lbs. capacity, 10 H.P., 220/440/3/60.
1—4'x6' Model SOSH, 5 HP. 220/440/3/60.

SAND MULLERS

Simpson
1—#2 Model H, Style E, 14 cu. ft per batch, 6' dia. pan.
1—#3 Model H, Style E, 30 cu. ft. per batch, 8' dia. pan.
5—#3, Style E, w/separate drive.
Beardsley-Piper
2—#70, 29 to 58 tons per hr., 18 cu. ft. per batch.
Link-Belt
1—Paddle type, 20" x 72".
1—Pugmill, 42" x 96".

EUCLID FOUNDRY & MACHINE EQUIPMENT COMPANY
14919 SARANAC ROAD **TELEPHONE: GLENVILLE 1-1222** **CLEVELAND 10, OHIO**

FOR SALE

TURBO BLOWERS WITH MOTORS

CFM	PRESS.	MAKE	CFM	PRESS.	MAKE
4500	16 oz.	G.E.	500	10 oz.	No.Am.
3500	40 oz.	Spencer	400	16 oz.	Spencer
2800	1 oz.	Spencer	400	4.3 oz.	Spencer
2700	16 oz.	Spencer	340	20 oz.	A-B
2500	7 oz.	Sturt.	320	12 oz.	Spencer
2000	2½ oz.	Spencer	225	16 oz.	Spencer
2000	1 oz.	Spencer	180	15 oz.	Spencer
1300	16 oz.	Spencer	110	16 oz.	Spencer
1150	20 oz.	No.Am.	9000	6" SP	Northern
675	16 oz.	No.Am.	2344	2" SP	Clarage
660	20 oz.	A-B	1100	4½" SP	Bayley

THE MOTOR REPAIR & MFG. CO.
1552 HAMILTON AVE.
CLEVELAND 14, OHIO

FOR SALE

1—#14 Pangborn Type GK Rotoblast Barrel drum 36" x 49" long, (14 cu. ft. capacity) designed to handle individual pieces up to 150 lbs. and load of 2500 lbs. Barrel complete with all electrical and other equipment. Reason for selling—installing a much larger unit. Can be inspected at site.

TREADWELL ENGINEERING CO.
EASTON, PA.

FURNACES FOR SALE

Ten used heat treating furnaces and two 7-ton gantry cranes. Good condition. priced to sell. Address: BAER STEEL PRODUCTS, INC., BOX 1428, BOISE, IDAHO.

SAVE MONEY ON YOUR PNEUMATIC TOOLS

High quality repair and rebuilding service—fast and economical. Send us your next pneumatic tool as a trial. Your money refunded if not satisfied, estimates furnished.

"WE WELCOME RUSH JOBS"

CENTRAL PNEUMATIC SERVICE CO.
512 LINDEN AVE.
DAYTON 3, OHIO
PHONE: MADISON 2701

FOR SALE

1—36" x 36" and 1—32" x 32" Hines Heavy Duty Aluminum Pop-Off Flask, 6" cope, 6" drag, with ¼" steel facing all flanges. In original crates.

TRANSIT CORE PLATES—JOHNS MANVILLE
NEVER USED

67—12 x 12 x ⅜ 149—18 x 24 x ¾
84—12 x 15 x ½ 154—24 x 16 x ¾

LIBERAL DISCOUNT

For further information and prices write:

EBALOY FOUNDRIES CO.
P.O. BOX 596
ROCKFORD, ILLINOIS

FOR SALE

1—"Moulders Friend" Sand Conditioner
3—Beardsley & Piper Model "M" Screenarators
1—Simplicity 2' x 3' Sand Conditioner
1—79/60 "American" Sand Cutter
3—SPO #2114 Jolt, squeeze, pin lift machines
1—Model 1000 M Bondactor Gun complete with water tank.

FOUNDRY SUPPLY COMPANY, INC.
5009 EXCELSIOR BLVD.
MINNEAPOLIS 16, MINN.

SMALL GRAY IRON CASTINGS FOR SALE

Castings up to 300 lbs. Write or Phone: OREGON CASTINGS COMPANY, LITITZ, PENNSYLVANIA, PHONE: 6-2462.

FOR SALE

DEMONSTRATOR 36 x 42 Rotary Barrel Shot Blast machine with dust collector. Used one month. With numerous spares. $3,000. Excellent reason for selling.

2-TON ROTARY OIL FURNACE for steel, iron, malleable and nonferrous. Run two months. This furnace is most efficient. Complete with all instruments and pre-heater. Electric heater for Bunker C Oil. Price reduced from $11,000 to $7,500. Firm.

BAMBER FOUNDRY, INC.
MARKET STREET
STAMFORD, CONNECTICUT

FOR SALE

One Twin Hopper Standard NeWay "Handy Sandy" Model HS-7-Gt, complete, slightly used, good condition.

KLUTTZ MACHINE & FOUNDRY COMPANY
BOX 980
GASTONIA, N. C.

FOR SALE

1—1200# Stroman-Dual Burner Pneumatic Tilt-Air Furnace.
1—24 x 48 Sly Roller Bearing Tumbling Mill with Motor.
2—Tabor Cantilever Type Jolt-Squeeze (1951) Molding Machines.
1—Magnetic Pulley 16" D x 20".
1—#225 Tilt Type Crucible Furnace.

In good condition, reasonably priced.

MARLBOROUGH FOUNDRY, INC.
555 MAPLE STREET
MARLBOROUGH, MASS.

Electric Melting Furnaces

LECTROMELT 1 Ton, Side Charge. 800 KW transformer 12000 Volt primary. Late type unit. In place Chicago, complete.

LECTROMELT 500# Type T Side Charge. 300-375 KVA Transformer GE Circuit breaker. Moore controls 2300 volt primary current. Late type, now in our warehouse Chicago.

DETROIT ELECTRIC, 1500# capacity, 13,200 primary voltage. Kuhlman transformers. Complete with controls.

2-BAILEY (Electric Furnace Co.) 75 KW Electric Arc Type side electrode tilting furnaces and transformers.

DETROIT ELECTRIC 350#, Type LFA with Kuhlman transformers and oil circuit breaker. 13,200 primary voltage.

DETROIT ELECTRIC with 350# and 1000# tapered shells, 2300V Kuhlman Transformer. Complete with panelboard and bus bars.

ACME EQUIPMENT CO., INC., 126 South Clinton Street, Chicago 6, Illinois, Phone: Andover 3-3430.

FOR SALE

AIR COMPRESSORS
Ingersoll Rand Type 10—14 x 9 x 12, 2 stage, 75 HP, 3/60/220/1200 rpm synchronous motor, 350 CFM at 100#.
5 x 5 Ingersoll Rand 10 HP motor.

BLOWERS
Spencer Turbo Blower, 2250 CFM at 16 oz. 15 HP 3/60/220 totally enclosed motor. New 1947.
Ingersoll Rand Motor Blower Type FS, Single Stage 4000 CFM @ 3.75 PSI, 100 HP, 220 V. G.E. Induction Motor.
Buffalo 7E Direct Connected Blower, 50 HP Westinghouse motor, 3/60/220-440 V, 3535 rpm, 28" wheel, 3500-4000 CFM at 32 oz. Flanged onutlet.
Spencer Turbo Blower. New 1949. 3500 cfm, 28 oz. with 40 HP 220-440 motor and Foxboro controls.

CONVERTER
100 KW Rotary Westinghouse 220 V 60 cycle primary 250 V DC, complete with controller and panel.

CORE OVENS
3—Section Foundry Equipment Co. Gas fired, 5 drawers per section.
4—Section Foundry Equipment Co. Gas fired, 5 drawers per section.

CRANES
5 Ton P & H Overhead Elec. Traveling Crane, 30'6" span, 15' lift (can be increased) 3 motor, 220 V A.C. New 1946.
10 Ton Northern Overhead Elec. Traveling Crane, double girder, fish belly, 3 motors, 230 V D.C., 54'7½" wide C to C of wheels can be cut down to fit smaller size.

CRUSHERS—PULVERIZERS
1—Stedman 15" x 12" Type A. One with 10 HP 220-440 V motor. One without motor.

FORK LIFTS
Baker 6000# Gasoline Fork Lift Trucks, KMH60, 120" lift, 88" collapsed height, 42" forks, solid tires. Rebuilt-Guaranteed.

GRINDERS, DISC
Besley 208 Double End 26" x 2⅜" wheel with 2 compound tables, V belt drive, 15 HP, 220-440 totally enclosed motor, magnetic starter controls.
2—U. S. Model 80 Double End 2-18" dia. wheels, 7½ HP motor, 2 swinging tables 8" x 14"—1 with hand lever feed.

GRINDERS, SNAGGING
McCabe 2" x 24" wheels, 48" between wheels, 3/60/440 V.
1—Hammond type 20 WR2—3" x 24" wheel, double end grinder, single speed, 20 HP Louis Allis Squirrel Cage, 220-440 V—1760 rpm motor.
2—U. S. DE, 20 HP adjustable speed.
1—U. S. DE, Model 65, 3" x 24" wheels, variable speed, 20 HP motor.

GRINDERS, SWING
2—Fox 10 HP 3/60/220-440 V, Swing Frame.
U. S. 15 HP, 3/60/440 V Swing Frame, 2 speed.
Fox 15 HP Swing Frame, 2 speed.
Marschke 20 HP, 2 speed.

HOISTS
500# American LoHed.
1000# Cleveland 220/440 V.
1000# Detroit 220/440 V.
5—1000# P & H Hevi Duty with trolley.
2—2000# P & H Hevi Duty with trolley.
2000# Detroit Electric.
2000# American LoHed.
11—4000# P & H Hevi Duty with trolley.
2—4000# P & H Hevi Duty with trolley and powered drive unit for moving hot metal.
2—5 Ton Air Hoists with motor driven trolleys.

LADLES
1 Ton Enclosed Gear Crane Ladle truck type 4 wheel car for 18" gage track, Whiting Junior.
1—20½" Top Whiting Enclosed Gear Ladle.
3—1500# Modern Cylindrical covered

MOLDING MACHINES
2—Champion Pin Pushouts, 38" x 40"—12" draw.
1—Johnson & Jennings 1015 Jolt Pin Lift, 30" x 38" table.
1—Champion Hand ram, hand clamp, hand rollovers 26" x 14" table.
1—Champion Hand Ram, Hand rollover, Hand draw core machines, 15 x 15 bed.
3—Davenport Portable Jolt Rollover Pattern Draw 20" x 24" tables, open end, 8" draw.
1—International Type G 24 x 10 Jolt Rollover, foot draw, 22 x 30 table, 10" draw.
1—Herman Molding Machine Jolt Rollover Pattern Draw, 20 x 30.
1—Herman Molding Machine Jolt Rollover Pattern Draw, 20 x 36.
1—International Type G 30 x 12 Jolt Rollover Foot Draw, 28" x 36" table, 12" draw.
1—International Type G 30" x 30" table, 9" draw, Portable.
2—International Type G 18" x 56" table, 8" draw. Portable.
1—International Type F Jolt Rollover 27 x 12, 12" draw, 35" x 26" table.
1—International Jolt Rollover Pattern 10" Draw, 22" x 30" plate, 6" jolt cylinder.
1—International Plain Jolt Molding Machine 48" x 60" table, no pit required.
1—Herman Jolt Rollover Pattern draw, 40" x 84" table, slotted nickel alloy table over regular table to accommodate various sized flasks, air clamp, new 1946. Used very little.
1—Herman 20" x 30" rollover pattern draw, 750# series. Air clamp.
2—Herman 20" x 24" Jolt Rollover Pattern Draw, 750# series. Air clamp.
1—Herman 4000# Series High Speed Rollover 30" x 60" with 32" x 48" bumper, 13" cylinder pattern device.
2—Milwaukee Arm Type Jolt Squeeze Strippers, 1500# capacity, Model 163-50 Serial 13104-5, 15" x 24" table, 16" x open end, pattern size. Late type.
1—Osborn 76J Portable Jolt Squeeze Molding Machine 12" cylinder.
3—Osborn Jolt Squeeze Molding Machines, 275J, 16 x 20 table, tilt back head.
2—Osborn 405 Jolt Rollover 40" x 70", 2000# capacity, 20" x 60" jolt table and 4 wheel receiving car.
1—Osborn Portable Jolt Rollover Pattern draw, 900# capacity. Model 601-13. 30" x 24" flask size, 10" draw.
1—Tabor 1000# Rollover, 30" x 60" table.

MULLERS AND MIXERS
Simpson #2 Motor on base, bucket loader.
Simpson #3 Motor on base, bucket loader.
Simpson #3 Type H open gear type.
Simpson #3 Open Gear Type, $1000.00.
American Model M Sand Cutter, 70" blades.
Kwick Mix Paddle Type.
Royer NDP 47 14" Belt, 4 rubber tires.

PREPARATOR
B & P #70 Preparator. Only used 3 months.

ROTOBLAST
Pangborn, table with 3-8" rotating work tables, 3 position loading, cleaning and touch-up designed for work similar in size to aircraft cylinders. Like New condition.

SAND SYSTEM
Beardsley & Piper #80 Speed Muller with 125 HP Fairbanks Morse 3/60/220-440V motor, air operated discharge, Clirage 15 HP Cooling Fan, mixing hopper.
14'—30" under muller conveyor motor and drive.
24" x 43' Trough belt conveyor.
24" x 30' Trough belt conveyor magnetic pulley.
48" x 18" x 45' bucket elevator.
4 Round sand storage bins with 2-30' bucket elevators arranged for storage of new or used sand.
4 Syntron vibrating feeders 30" x 84", type FC4 with controllers.
2—5' x 5' x 5' sand hoppers for wheelbarrow delivery.
1 Flat belt conveyor 20" x 160'.

SHAKEOUTS
2—4' x 6' Simplicity.

SPEED REDUCERS
We have a large stock of speed reducers and geared head motors. Write us your needs.

WIRE STRAIGHTENERS
2—Climax 1 HP motor.

ACME EQUIPMENT CO., INC.

WE WILL BUY FOR CASH A SINGLE PIECE OF EQUIPMENT OR YOUR ENTIRE FOUNDRY

126 South Clinton Street Phone: Andover 3-3430 Chicago 6, Illinois

PUBLIC AUCTION SALE

2 Complete Gray Iron Foundries

1 Complete Electric Furnace Steel Foundry

Formerly property of

WESTERN FOUNDRY COMPANY

3634 S. Kedzie Avenue **Chicago, Illinois**

and surplus equipment from other foundries.

THURSDAY and FRIDAY

August 19 and 20, 1954

2—General Electric 5 ton Car type Electric Annealing Furnaces 250 KW, 1 unit low temperature 1200°—1500° other 1500° to 1800°, vented cooling hood.

1—Lectromelt Top Charge 2 ton Type CQT 2000 KW Allis Chalmers transformers, 12000 volt primary. Late type unit.

3—Sand Slingers, tractor type
2—B & P 30 Sand Mullers
1—B & P 50 Sand Muller
1—B & P 60 Sand Muller
3—American Wheelabrator Tumblasts 36 x 42, 42 x 48 and 48 x 48
1—Air Compressor, 175 HP Synchronous Ingersoll Rand, 5 x 5 10 HP Pennsylvania
15—Bridge Cranes, Whiting
20—Hoists, Ingersoll Rand 1000 to 4000#
18—Hoist, Budget 1000# to 4000#
1—P & H 3 ton Electric Hoist
1—Core Oven 4—4 x 5 car capacity gas fired electric upraising doors.
1—Whiting Monorail type charge, 150' rail, 4 buckets
4—Hough Payloaders
6—Lift Trucks, Ross, Clark, Mobilift
6—Blowers from 10 HP up to GE 7500 CFM Cupola blower airway controls
3—Core Blowers, Redford and International
10—Swing Frame Grinders, Fox and Marschke
25—Ladles covered cylindrical geared, teapot spout inside and outside, top pour, bottom pour
10—B & P Champion Pin Lifts Push Offs, 29" pin centers, 8" x 10" lifts

20—Grinders, all types, Gardner Flat Disc 54", Snag Grinders U. S. 65's—20 HP 30 x 3 x 12 wheels, Hisey Wolf 30 N3—15 HP motors and many others, some use smaller wheel sizes
1—Milwaukee 3 H Milling Machine with Rusnok Universal Head

Molding Machines:
3—Spo 506 Jolt Rollover Pattern Draw
4—Spo 508 Jolt Rollover Pattern Draw
1—Osborn 276 Jolt Squeeze
6—Osborn 275 Jolt Squeeze
3—Spo 110 Jolt Squeeze
2—Spo 413 D Jolt Squeeze Rollover Pattern Draw
6—24 x 36 Plain Jolt International and Milwaukee
2—36 x 48 Milwaukee Plain Jolt
4—Milwaukee 181 Jolt Squeezers
10—Champion Jolt Rollovers, 20 x 8" x 24 x 12"
2—Osborn 214 Jolt Squeeze Pin Lifts
4—Spo 307 Jolt Pin Lifts
Several International Hand Rollovers 15 x 15 and 15 x 22
1—Osborn 714 Jolt Squeeze Pin Lift
10—Champion Pin Pushoffs 8" x 10" draw
2—Yard Cranes, 5 ton Krane Kar and 7½ ton Hughes Keenan
Tons of metal flasks, core plates, air tools.

FREE ILLUSTRATED AUCTION CIRCULAR ON REQUEST.

INSPECTION: AUGUST 16, 17 AND 18.

Wire, Write or Phone

INDUSTRIAL PLANTS CORPORATION

(AUCTIONEERS, APPRAISERS, LIQUIDATORS)

316 S. La Salle Street **Chicago 4, Illinois**

Toledo **Tel: Wabash 2-7315** New York

FOR SALE

MOLDING MACHINES

10—**S P O** No. 110J Portable Squeeze
1—**S P O** No. 506 Jolt Rollover Pattern Draw. 600 lbs. Cap., 10" Draw, 24" x 25" Table. Stationary and Portable Type.
2—**S P O** No. 507 Jolt Rollover Pattern Draw, 32" x 40" Table, 1500 lbs. Jolt Capacity Draw 10" to 20".
2—**OSBORN** No. 142 Jolt, Rollover, Foot Draw, 14½" x 24" Table Draw 8", 350 lbs. capacity.
4—**OSBORN** Model 601, Jolt Rollover, Pattern Draw Machines. 600 lbs. capacity. Flask 30". For core work.
6—**OSBORN** No. 275J, Jolt Squeeze Machines, portable and stationary.
3—**OSBORN** No. 559 HD Jolt Strippers, Stationary, Table 25" x 30", Jolt 1200 lbs.
6—**OSBORN** Jolt Squeeze Model #75J, 10" cylinder, 3½" Jolt, Cylinder, Table 16" x 20".
2—**HERMAN** Pneumatic 40" x 60", 15" Solid Cylinder Jarring Molding Machine, Heavy Duty Bumper Type.
1—**JOHNSTON & JENNINGS** #401-C Portable Jolt Squeeze Machine.
1—**JOHNSTON & JENNINGS** #681-C Portable Jolt Stripper, 24" x 30" Table.
1—**JOHNSTON & JENNINGS** Model 1216S Stationary Jolt Pin Lift, table size 36" x 54", Draw 16". Capacity 3000 lbs.
1—**JOHNSTON & JENNINGS** Model 918-B Jolt Rollover Pattern Draw, 44" x 54" Table, 20" Draw, 3000 lbs. capacity.
3—**TABOR** Jolt Squeeze Machines, Portable.
2—**TABOR** Jolt Rollover and Pattern Draw, Draw 10", 600 lbs. capacity, 22" x 42" Table. Shockless Jar Type, Portable.
2—**TABOR** Jolt Rollover Pattern Draw, 30" x 40" Table, Draw 12" Capacity 1000 lbs., Portable.
1—**INTERNATIONAL** Model PKL, Jolt Squeeze, Air Pin Lift Machines. 18" x 24" Table, Lift 5½", Squeeze Cylinder, 12".
2—**INTERNATIONAL** Type RES, Size 15" x 8", Jolt Squeeze, Rollover, Draw Machines. Table size 18" x 34".
4—**INTERNATIONAL** Type G, Air Jolt, Air Turnover Foot Draw Machines, Sizes 20" x 8"—24" x 8"—30" x 8"—24" x 10".
1—**DAVENPORT** Model 2SSA Jolt Rollover, and Pattern Draw, 1500 lb Jolt Capacity, 12" Draw, 30" x 40" table. Used less than 1 year.
1—**DAVENPORT** Model 2SA, Jolt Rollover and Pattern Draw, 1500 lbs. capacity, 12" Draw, 34" x 48" Table.
3—**MILWAUKEE** Model 104, Jolt, Squeeze, Machines, 10" cylinder, 17" x 26" table.
1—**MILWAUKEE** #1030 Loft Pin Lift. Table size 28" x 34", 12" Draw, 1000 lbs. cap.

SAND PREPARATORS

4—**BEARDSLEY & PIPER** Model "S" Screenerator, Pneumatic Tires.
2—**BEARDSLEY & PIPER** Model "M" Screenerator, Pneumatic Tires.
3—**BEARDSLEY & PIPER** Model "L" Screenerators, Pneumatic Tires.
1—**BEARDSLEY & PIPER** Nite Gang, Ser. No. SNG 1-491, excellent condition, used 1 year.
1—**BEARDSLEY & PIPER** Sand Preparator. Portable, Model 70, with magnetic separation, 90 cu. ft. hopper, aerator and gyrating screen, serial No. SC-73. New in 1946, excellent condition.
1—**ROYER** Model NC-4 Sand Conditioner, portable, 12 to 15 tons.
2—**ROYER** Model C-2 Sand Conditioners, portable, 25 to 30 tons per hour.
1—**JEFFREY** Type "P" Sand Conditioner, Class B Mixer, Portable.
1—**AMERICAN** Sand Cutter, Model AM, Size 69 x 45. Late model.
1—**AMERICAN** Sand Cutter, Model M, Size 79 x 60. Late Model.
1—**ROYER** Shakeout and Sand Conditioner Unit.

SHAKEOUTS

1—**SIMPLICITY** Shakeout. 3' x 3', Serial No. 33—SOS—106, Model S, 1000 lbs. cap.
1—**SIMPLICITY** Shakeout, 4' x 6', Serial No. 46—SOB—145, Model B.
2—**SIMPLICITY** Shakeouts, 4' x 8', Serial No. 48—SODE 104, Model DE, 16,000 lbs capacity.
1—**ROYER** Shakeout and Sand Conditioning Unit. Serial No. ST-47.

CORE BLOWERS

1—**OSBORN** No. 91 Core Blower, Serial 10050.
2—**OSBORN** No. 92 Core Blowers, Serial No. 9703A and 8692-C, Air Clamps.
1—**DEMMLER,** No. 1-E Core Blower, Serial No. 3287. Equipped with Air Clamps, 1950 Machine.
1—**DEMMLER** No. 2 Core Blower, Air Clamps.
2—**REDFORD** Core Blower No. 1, Cartridge Bench Type.

TRAMRAIL & MONORAIL

100'—**AMERICAN** Tramrail, complete with two Bridges 15' and 14', and two Crossovers.
125'—**LOUDEN** Monorail, complete with four 20' Bridges and all accessories.

AIR & ELECTRIC HOISTS

1—**INGERSOLL RAND,** Size D, 4000 lbs. Late type Air Hoist.
1—**INGERSOLL RAND,** Size C, 2000 lbs. Late type Air Hoist.
2—**INGERSOLL RAND,** Size B, 1000 lbs. Late type Air Hoists.
1—**LITTLE GIANT,** Model A, 1000 lbs. capacity.
4—**THOR PNEUMATIC,** 1000 lbs. capacity, low head room.
1—**ELECTRO-LIFT,** 3000 lbs capacity, low head room, Hoist, 220/440 Volts, Cable Type.

SAND BLASTING EQUIPMENT

1—**AMERICAN WHEELABRATOR** Tumblast, 42" x 48", Model "450", complete with Skip Hoist. Like new. Serial No. A-37608.
1—**AMERICAN WHEELABRATOR** Multi-Table Blast Machine, 8-27" Tables, with Shot Return and Dust Collector. Serial No. A-44791, Model BM 66900.
1—**AMERICAN WHEELABRATOR** Tumblast, 48" x 48" with Skip Hoist, shot return and dust collector, Serial No. 37,642.
1—**J. W. PAXSON** Upright Sand Blast Cabinet.

TUMBLING BARRELS

1—**NEW HAVEN** Air Blast Barrel 48" x 42". Equipped with Motor and Drive, 1942 unit.
1—**WHITING** Tumbling Barrels 30" x 60", plate 1", complete with 5 H.P. gear head motor drive, and starter, 1952 unit.
1—**SLY** Tumbling Barrel, 42" x 72", 10 H.P. Gear Head Motor, and Electrical.
7—**SLY** Tumbling Barrels, 36" x 60", 5 H.P. Gear Head Motor, and Electrical.
2—**SLY** Tumbling Barrels, 42" x 72", Square Type, 10 H.P. Gear Head Motor, and Electrical.
4—**SLY** Tumbling Barrels, 36" x 72", Flat Belt Drive.

B & P SANDSLINGERS

2—Tractor Type 6' arms, with 4' impeller head extensions, 4" wide liner and cups, 19" head, 15 HP motor or impeller, 10 HP motor for propulsion on tracks. Each machine equipped with additional impeller unit, 25 HP motor, 5" liner and cups. 220/440 volts.
1—Stationary Type Model DB, 16" head, 4" tip, 6" arm, 4' impeller head extension, motor two speed, dual 10-15 HP, 220/440.
1—**B & P,** Model Tractor Type Sand Slinger with Magnetic Tower, 13' arm, 16" head, 4' ramming unit, 4" tip. 1951, like new.

GRINDING EQUIPMENT

2—**FOX** No. 5 High Speed Stand Grinders. Wheel size 24" x 3". 10 H.P. motor, 220/440 volts.
1—**HAMMOND** Model WR-1 Double End Snagging Grinder, 7½ H.P., 220/440/3/60.
2—**HAMMOND** Model WH-10 Donble End Grinders with (2) 7½ H.P. 220/440 3 phase, 60 cycle, wheel size 20" x 2" x 2".
1—**U. S. ELECTRIC** Double End Snag Grinder, Model 69, 10 H.P., 20" x 3" wheel size.
1—**U. S. ELECTRICAL** Swing Grinder, 24" x 3" wheel, 15 H.P., 220/440 volts.
1—**QUEEN CITY** Model 100 Double End Disc Grinder with 10 H.P. 220/440 Volt Motor, size 20" x 2" x 2".

CUT-OFF SAWS & MACHINES

1—**TABOR** Cut-off Saw, Serial No. 24626, 10 H.P. Motor.
3—**TESSEMER** Sprue Cutters, Model "H", cap. ¾" Brass. 3 H.P. Motor.

CORE OVENS

1—**COLEMAN** Core Oven, gas fired, 2 doors opening into single compartment, 37" wide, 78" high and 35" deep, adjustable trays.
2—**DESPATCH,** Gas Fired, Drawer Type Core Ovens, Drawers 46" wide, 59" deep, 9" high. Complete with Rail Supports and Controls. These machines are in excellent condition and were new in 1944.

DIELECTRIC CORE OVEN

Manufactured by Induction Heating Corp., Model #M-800A, 600 lbs, per hr, 8" max. hgt. of core, 24" wide, 220 volts, 15 KVA, 100 amps. Water cooled transformer, 60 cycle. 3 phase, belt 24" x 52" long. Machine had only 300 hrs. use. New in 1950.

CONVEYORS—Roller - Apron - Belt

300'—**MATHEWS** Roller Conveyor, Above Rail 20" wide, 2½" Rollers, on 4" centers.
300'—**MATHEWS** Roller Conveyor, Above Rail 24" wide, 2¾" Rollers. 4" Centers.
1000'—**MATHEWS** Roller Conveyor, Above Rail 10" wide, 2½" Rollers. 4" Centers.
200'—Heavy Duty Roller Conveyor 30" wide, 3" Rollers on 6" centers, ⅞" shaft, 4" channel, Roller above rail.
40'—Roller Conveyor 14" wide, 2" Rollers, above rail.
1—**FARQUHAR** 18" x 40', Model "343", Portable Trough Conveyor with 5 H.P. Motor and Starter, 3 Sided Feed Hopper.
1—**FARQUHAR** 18" x 19', Model "341", Undercar Unloader, equipped with Rubber Belt and 5 H.P. Motor.
1—**GODFREY** 18" x 19' Undercar Unloader, equipped with Steel Belt and 5 H.P. Motor.
1—Link Belt Steel Apron Conveyor, 18" x 24', with Motor and Drive.
1—Link Belt Steel Apron Conveyor, 24" x 20'.

SAND MULLERS

5—**SIMPSON** #3, enclosed gearing, style "C". Capacity 3000 lbs. 8' pan diameter, serial nos. in 58,000. 1946.
1—**SIMPSON** No. 0 Sand Muller, 175 lb. batch with motor and drive.
1—**SIMPSON** No. 1½ Sand Muller, Unit Drive, 750 lb. batch.
1—**SIMPSON** No. 2 Sand Muller. Open gear type motor drive.
1—**BEARDSLEY & PIPER** No. 60 Speed Muller, 10' Batch, complete with motor drive and all electrical, excellent condition.
2—**BEARDSLEY & PIPER** #3½ Mulbaros.

ELECTRIC FURNACES

4—**DETROIT** Electric Rocking Type Furnaces. Model AA, 1000 lbs. Cold charge, complete with single phase Transformers.

OIL & GAS FIRED FURNACES

5—**FISHER** #400 Crucible Type BBI, Hand Tilting, with Motors and Blowers, new bricking, gas or oil fired, like new. 4 years old.
3—**FISHER** Model MNP Tilting Furnaces, 2000 lbs. capacity in Aluminum, 1500 lbs., for magnesium, complete with New Pot, blowers, and electrical tilting mechanism. Offered at Tremendous Savings.
1—**STROMAN** #600, Model "U" Tilting Reverberatory Furnace, 3 H.P. Motor and Blower, gas or oil fired; new 1949.
1—**YORK-WALKER** #28 Hand Tilt Furnace, 300-400 Crucible. New Bricking, Motor and Blower. Coke Fired.
4—Holding Furnaces, 500 lbs. capacity, Aluminum, Newly Bricked with Motor and Blower.

CUPOLA & FURNACE BLOWERS

Manufactured by G.E. centrifugal blower, type FS 3670-9400, serial No. 27006, motor 100 HP, 3600 RPM, Model 11A585.
1—**BUFFALO FORGE** No. 7-E Blower, 25 H.P., 3600 rpm, 220/440 volts. 28" wheel, 32 oz., 1600 cfm.
5—Assorted Blowers for Furnaces, 2-3-5 H.P., 16 oz.
1—**NORTH AMERICAN** Turbine Blower, 24 oz., 1900 cfm, with 20 H.P. Motor.
2—**NORTH AMERICAN,** 7½ H.P., 1900 CFM, 8 oz.
1—**STURTEVANT** #9 Cupola Blower, 75 H.P., 220/440 V., 3 Pr., 60 Cycle.

LADLES & POURING DEVICES

6—Modern Pouring Device, Models "F", "FA", "F-9", "FA-9". Ladle Hoists, with 17" Taper Covered Ladles, 500 lbs. capacity with Hand Tilting Devices.
12—**WHITING** Pouring Devices, Models 1000 & 2000, with 500 lbs. capacity. Ladles, complete with Trolleys and Hand Tilting Devices.
1—**WHITING** Ladle, 2000 lbs. capacity, enclosed gearing. Nose tilt.
1—**WHITING** Ladle, 4000 lbs. capacity, enclosed gearing. Nose tilt.

AAA MACHINERY & EQUIPMENT CO.

15539 SARANAC ROAD *Members of American Foundrymen's Society* **CLEVELAND 10, OHIO**

FAMOUS LAST WORDS:

"they wouldn't dare"

That's what they said the day before Pearl Harbor. Remember? But by now you'd think people would have learned. Let's face it—we must be ready for disaster at any moment. It may be an atom bomb—or it may be a fire, a flood, a hurricane. It's only common sense to be prepared for it, whatever it is. Take these precautions TODAY:

- ☐ **Enlist the help** of your local Civil Defense Director.
- ☐ **Check contents** and locations of first-aid kits.
- ☐ **Send staff** to Red Cross courses. They may save your life.
- ☐ **Promote preparedness** in your community. Your local CD Director can show you how.

Set the standard of preparedness in your plant city—check off these four simple points NOW.

ADVERTISING INDEX

A

Abrasive Shot & Grit Co., Inc. 201
Acheson Colloids Co. 175
Acme Foundry Co. 243
Adams Co., The 54
Aerovent Fan Co., Inc. 250
Air Reduction Co., Inc. 30
Ajax Electric Co. 225
Ajax Electric Furnace Corp. 225
Ajax Electrothermic Corp. 225
Ajax Engineering Corp. 225
Allied Chemical & Dye Corp., Solvay Process Div. 188
Allis-Chalmers 50
Alloy Metal Abrasive Co. 177
American Air Filter Co., Inc. 26
American Air Filter Co., Inc., Herman Nelson Div. 246
American Brake Shoe Co., Electro-Alloys Div. 64
American Bridge Div., United States Steel Corp. 27
American Lava Corp. 24
American MonoRail Co. 219
American Smelting & Refining Co., Federated Metals Div. 154
American Steel Dredge Co., Inc., Wayne Crane Div. 192
American Wheelabrator & Equipment Corp. 111, 140
Apex Smelting Co. 169
Archer-Daniels-Midland Co., Foundry Products Div. 4, 5
Atlantic Abrasive Corp. 237
Automotive Pattern Co. 236

B

Babcock & Wilcox Co., The, Refractories Div. 108
Baker-Lull Corp., The 40
Barber-Greene 246
Baroid Sales Div., National Lead Co. 20
Bartlett, C. O., & Snow Co., The Back Cover
Bay State Abrasive Products Co. 165
Beardsley & Piper Div., of Pettibone Mulliken Corp. 133, 134, 160, 161
Beryllium Corp., The 232
Black, Sivalls & Bryson, Inc. 19
Blaw-Knox Co., Blaw-Knox Equipment Div. 231
Borden Co., The, Chemical Div. 17
Buffalo Forge Co. 217
Buffalo Pattern Corp. 180

C

Campbell-Hausfeld Co., The 223
Carborundum Co., The 60, 237
Carman, Edwin S., Inc. 246
Centrifugal Casting Machine Co. 248
Chicago Eye Shield Co. 222
Christiansen Corp. 25
Cincinnati Milling Machine Co., The, Cincinnati Milling Products Div. 13
Cities Service Oil Co. 215
Clark Equipment Co., Industrial Truck Div. 62, 63
Clearfield Machine Co. 37
Cleveland Chaplet & Mfg. Co. 248
Cleveland Crane & Engineering Co., The, Cleveland Tramrail Div. 9
Cleveland Flux Co., The 107
Cleveland Metal Abrasive Co., The 130
Cleveland Tapping Machine Co., The 208
Cleveland Tramrail Div., The Cleveland Crane & Engineering Co. 9
Cleveland Vibrator Co., The 234
Columbia-Southern Chemical Corp. 245
Crobaugh, Frank L., Co., The 250

D

Danko Pattern & Mfg. Co., Inc. 248
Dayton Pneumatic Tool Co. 243
DeBardeleben Coal Corp. 248
Delta Oil Products Co. 56
Demmler, Wm., & Bros. 153
Desmond-Stephan Mfg. Co. 218
Detroit Electric Furnace Div., Kuhlman Electric Co. 163
Detroit Hoist & Machine Co. 240
Detroit Testing Machine Co. 238
Dietert, Harry, W., Co. 244
Dings Magnetic Separator Co. 61
Dow Corning Corp. 38
Durez Plastics & Chemicals, Inc. 136, 137

E

Eastern Clay Products Dept., International Minerals & Chemical Corp. 145
Eastman Kodak Co., X-Ray Div. 227
Eaton Chemical & Dyestuff Co. 242
Electric Furnace Co., The 246
Electro-Alloys Div., American Brake Shoe Co. 64
Electro Metallurgical Co., A Div. of Union Carbide & Carbon Corp. 58

F

Fanner Mfg. Co., The 65
Federal Foundry Supply Co., The 2, 8, 14, 15
Federated Metals Div., American Smelting & Refining Co. 154
Flexible Steel Lacing Co. 201
Foundry Equipment Co., The 47
Fremont Flask Co., The 6
Fuller Co. 59

G

Gardner-Denver Co. 16
Gerotor May Corp. 247
Girdler Co., The, A Div. of National Cylinder Gas Co. 53
Globe Iron Co. 187
Great Lakes Carbon Corp., Electrode Div. 203
Great Western Mfg. Co. 241

H

Harbison-Walker Refractories Co. 11
Harnischfeger Corp., Welding Div. 198

Continued on page 262

FOUNDRY
BUSINESS STAFF

GEORGE A. POPE, *Business Manager*
MARY JANE KIMPEL, *Advertising Service*

New York ... J. F. AHRENS, J. L. OZANNE
Chicago ... A. W. JOHANSEN, L. R. HETKE
Cleveland ... A. L. KLINGEMAN, J. K. GILLAM
San Francisco ... F. J. FULLER
ROBERT W. WALKER CO.
Los Angeles ... F. J. FULLER
Griffin, Ga. ... F. J. ALLEN
London ... VINCENT DELPORT

Market Research and Promotion
DAVID D. GIBBS, *Manager*
JEANNE FRANKLIN
MILDRED CHRISTOPHER

Circulation Department
G. R. EBERSOLE, *Manager*
BETTIE THOMPSON

Classified Advertising Department
DOLORES BRANT, *Manager*

Production Department
RICHARD J. STRNAD, *Manager*

Main Office
Penton Building, Cleveland 13, Ohio
Main 1-8260

Branch Offices
New York, 17 60 East 42nd St. Murray Hill 2-2581
Chicago, 11 520 N. Michigan Ave. Whitehall 4-1234
Detroit, 2 6560 Cass Ave. Trinity 5-3024
Los Angeles, 48 6262 Commodore Sloat Dr. Webster 1-6865
Pittsburgh, 19 2837 Koppers Building Atlantic 1-3211
San Francisco, 4 57 Post St. Sutter 1-5568
Washington, 4 1123 National Press Building Executive 3-6849
London 2 Caxton St. Westminster, S.W. 1
Griffin, Ga. 331 South 12th St.

Published monthly by
THE PENTON PUBLISHING COMPANY
G. O. HAYS ... *President and Treasurer*
R. C. JAENKE ... *Executive Vice President*
F. G. STEINEBACH ... *Vice Pres., and Secretary*
F. O. RICE ... *Vice President*
J. P. LIPKA ... *Asst. Secy. and Asst. Treas.*
Also publisher of STEEL • MACHINE DESIGN NEW EQUIPMENT DIGEST • AUTOMATION

Subscription: United States, possessions and Canada, one year $5; two years $8. Other foreign countries, one year, $10. Single copies 75 cents. Copies published three months or more previous to date of current issue, $1.00

Member: National Business Publications, Inc.; and Society of Business Magazine Editors. Copyright 1954 by THE PENTON PUBLISHING CO.

Entered as second class matter at postoffice at Cleveland, Ohio, under act of March 3, 1879.

FOUNDRY is indexed regularly by Engineering Index Inc.
29 West 39th St., New York 18.

BPA NBP

ADVERTISING INDEX

Harrison Abrasive Div., Metals Disintegrating Co., Inc. 172
Hauck Mfg. Co. 243
Herman Pnematic Machine Co. 142, 143
Hickman Specialty Co. 248
Hickman, Williams & Co. 157
Hines Flask Co., The 44, 45
Hough, Frank G., Co., The 148

I

Illinois Testing Laboratories, Inc. 220
Imperial Belting Co. 10
Ingersoll-Rand 173
Injection Molders Supply Co. 245
Industrial Crane & Hoist Corp. 213
Industrial Equipment Co. 234
International Minerals & Chemical Corp., Eastern Clay Products Dept. 145
International Molding Machine Co. 127
International Nickel Co., Inc., The 1
Ironton Fire Brick Co., The 209

J

Johns-Mansville 156, 162
Johnston Mfg. Co. 235

K

Keller Tool Co. 48
Kuhlman Electric Co., Detroit Electric Furnace Div. 163

L

Lanly Co., The 179
Lindberg Engineering Co., Lindberg-Fisher Div. 18
Lindberg-Fisher, A Div. of Lindberg Engineering Co. 18
Linde Air Products Co., A Div. of Union Carbide & Carbon Corp. 211
Link-Belt Co. 57

M

Macklin Co. 21
Macleod Co., The 230
Master Pneumatic Tool Co., Inc., The 250
Mathews Conveyer Co. 12
Mathieson Chemical Corp., Mathieson Industrial Chemicals Div. Inside Front Cover
Metals Disintegrating Co., Inc., Harrison Abrasive Div. 172
Mid-West Abrasives 229
Milwaukee Chaplet & Mfg. Co. 206
Modern Equipment Co. 264
Monsanto Chemical Co., Plastics Div. 167
Mullite Refractories Co., The 230
Murphy, Jas. A., & Co., Inc. 249

N

National Carbon Co., A Div. of Union Carbide & Carbon Corp. 158
National Cylinder Gas Co., The Girdler Co. Div. 53
National Engineering Co. 22, 23
National Lead Co., Baroid Sales Div. 20
Nelson, Herman, Div., American Air Filter Co., Inc. 246
New York Belting & Packing Co. 114
Newaygo Engineering Co. 147
Newcomb-Detroit 249
Niagara Falls Smelting & Refining Div. 236
Nicholls, Wm. H., Co., Inc. 42
Norton Co. 36, 49

O

Ohio Electric Mfg. Co., The 248
Ohio Ferro-Alloys Corp. 129
Oliver Machinery Co. 245
Osborn Mfg. Co., The 190, 191

P

Pangborn Corp. 31, 43
Penn Iron Works, Inc. 244
Pettibone Mulliken Corp., Beardsley & Piper Div. 133, 134, 160, 161
Philadelphia Coke Co. 244
Pittsburgh Crushed Steel Co. 159, 194
Pittsburgh Lectromelt Furnace Corp. 155
Pittsburgh Metals Purifying Co. 195
Pittsburgh Coke & Chemical Co. 205
Porcelain Products, Inc. 216
Pressed Steel Div., Republic Steel Corp. 171

R

R & J Foundry Co. 242
Radium Chemical Co., Inc. 239
Ready-Power Co., The 168
Reda Pump Co. 238
Redford Iron & Equipment Co. 221
Reece, Herbert A., & Associates 251
Republic Coal & Coke Co. 250
Republic Steel Corp. 151, 171
Republic Steel Corp., Pressed Steel Div. 171
Rice Pump & Machine Co. 251
Rock Island Millwork Co., Resinwood Div. 8
Rotor Tool Co., The 193
Roura Iron Works, Inc. 220
Royer Foundry & Machine Co. 101

S

Schneible, Claude B., Co. 32
Schrader's A., Son Div. of Scovill Mfg. Co., Inc. 185
Scovill Mfg. Co., Inc., A. Schrader's Son Div. 185
Shanafelt Mfg. Co., The 67
Shell Process, Inc. 28, 29
Shepard Niles Crane & Hoist Corp. 207
Sidley, R. W., Inc. 246
Silent Hoist & Crane Co. 233
Sly, W. W., Mfg. Co., The 228
Smillie, C. M., & Co. 66
Smith Oil & Refining Co. 46
Smooth-On Mfg. Co. 251
Solvay Process Div., Allied Chemical & Dye Corp. 188
Sonken-Galamba Corp. 240
SPO, Inc. 116, 117
Standard Conveyor Co. 202
Standard Horse Nail Corp. 235
Stearns Magnetic, Inc. 210
Steel Shot & Grit Co. 159
Steel Shot Producers, Inc. 194
Sterling Wheelbarrow Co. 68, 233
Stevens, Frederic B., Inc. Inside Back Cover
Swan-Finch Oil Corp. 247

T

Tabor Mfg. Co., The 7
Tamms Industries, Inc. 250
Taylor-Wharton Iron & Steel Co. 242
Thiem Products, Inc. 103
Timken Roller Bearing Co., The 55
Toledo Scale Co. 178
Tracerlab, Inc. 247
True Gun-All Equipment Co. 39

U

Union Carbide & Carbon Corp., Electro Metallurgical Co. 58
Union Carbide & Carbon Corp., Linde Air Products Co. 211
Union Carbide & Carbon Corp., National Carbon Co. 158
United States Graphite Co., The, Div. of The Wickes Corp. 139
United States Steel Corp., American Bridge Div. 27
United States Steel Corp., Subsidiaries 27
Universal Engineering Co. 41

W

Wayne Crane Div., American Steel Dredge Co., Inc. 192
Wellman Engineering Co., The 251
Westover Engineers 248
Whitehead Bros., Co. 35
Whiting Corp. 182, 183
Wickes Corp., The, The United States Graphite Co. Div. 139

Table of Contents, Page 3

Classified Advertisers, 252, 253, 254, 255, 256, 257, 258, 259

time to be bold

Orders harder to get? Competitive pressure increasing?

Where is the management who won't agree it's time to urge the sales force to fight harder—to step up its sales calls—to develop more new customers?

Grabbing the initiative in times like these is what makes new leaders. The company that steps out boldly today capitalizes on competitive weakness. It pushes volume to win a larger share of available business. It improves its industry position and challenges old line leaders.

Yes, this is the time to be bold—in selling—*and in advertising*. The company that aspires to leadership makes no *little* plans.

It hits—and hits hard with everything it's got. It demands that its advertising work harder—that its impact be increased—that its contacts be stepped up. Alert management today is giving advertising *more* jobs to do, in order that its sales force can become *more productive*. Has your company raised its sights to fight harder with advertising?

THE PENTON PUBLISHING COMPANY

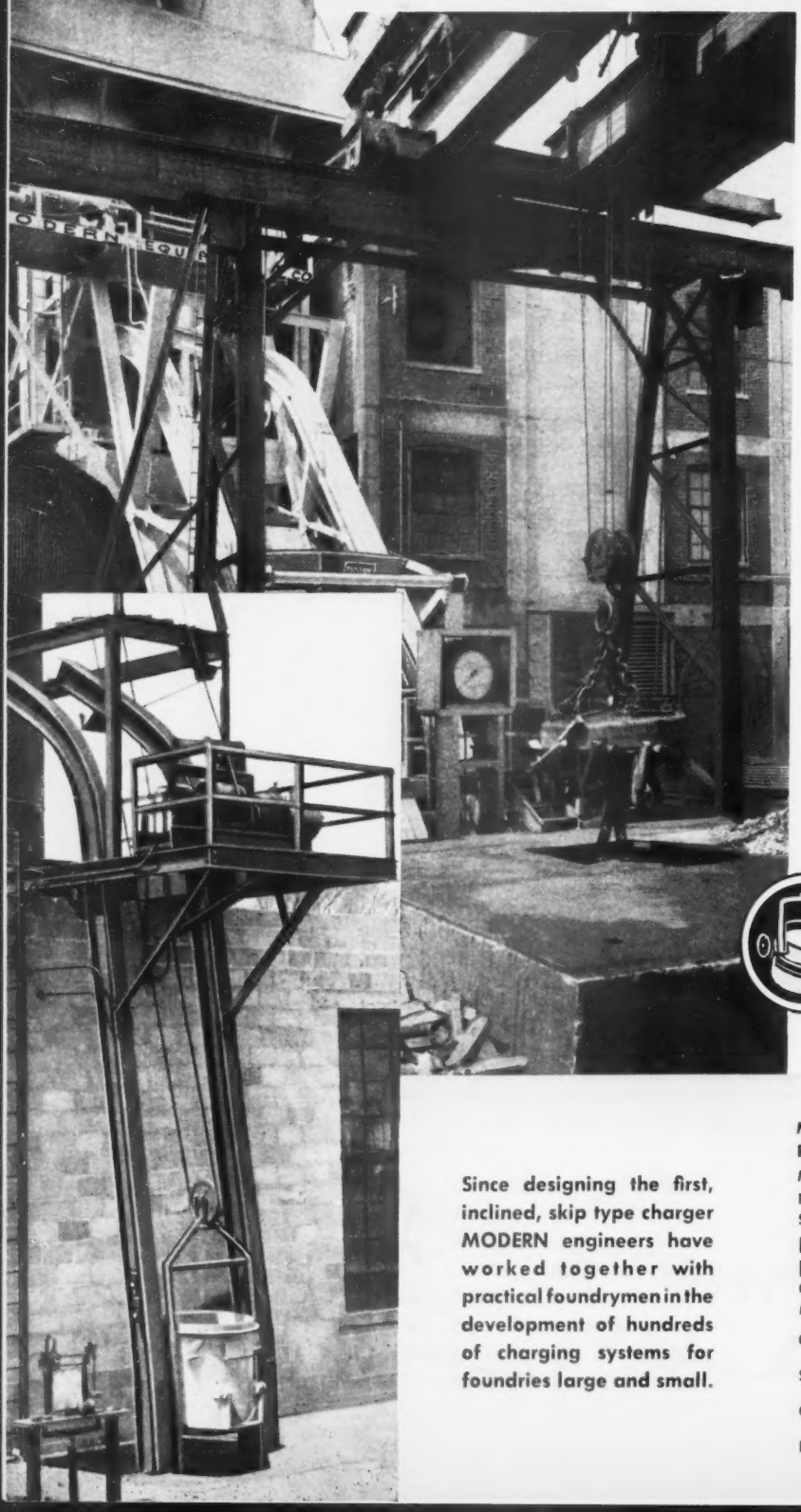
PENTON BUILDING • CLEVELAND 13, OHIO

CHARGE-MAKE-UP MEN may push buttons . . .

OR, push wheelbarrows . . .

BUT the results are different!

There are marked differences in charging costs! Differences in control and supervision! Differences, too, in the quality of metal cast!



Through MODERN, push-button charging a finger-tip control is placed within easy reach of one operator. He is responsible for selecting, weighing and placing the charge in the cupola. With this uniform and accurately controlled charge, going into the cupola, there is taken out a uniform quality of metal. This improved quality of metal, alone, has been known to defray the investment in mechanical charging. Plus values are the savings in man power and improved over-all safety.

SO whether you are planning to invest $6,000 or $60,000 in your profit-boosting, mechanical charging system we invite you to figure with MODERN engineers — the men who developed the original, inclined, skip type charger. For additional planning data ask for new bulletin S-147-B. The coupon will reserve a copy for you . . .

MODERN

MODERN EQUIPMENT COMPANY
Port Washington, Wisconsin

Since designing the first, inclined, skip type charger MODERN engineers have worked together with practical foundrymen in the development of hundreds of charging systems for foundries large and small.

MODERN EQUIPMENT COMPANY, DEPT. F-8,
Port Washington, Wisconsin.

Mail to my attention:

New bulletin on SMALL-CONE charging, S-147-B ☐
Standard catalog on cupolas and cupola charging, 147-A ☐

NEW, P-152 CATALOG ON POURING DEVICES AND LADLES ☐
Catalog on cranes and monorail systems, 150 ☐
More information on FREE use of MODERN, color, sound films ☐

Company .....

Street ..... Zone .....

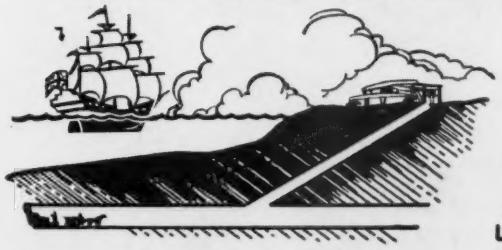
City ..... State .....

Individual .....

"Facing" Facts

FROM STEVENS FACING DEPARTMENT

SEACOAL WAS FIRST DISCOVERED IN ENGLAND, NEAR NORTHUMBERLAND, WHERE THE SEA HAD DENUDED THE SHORE. IT WAS GATHERED BY WOMEN AND CHILDREN AND SOLD FOR FUEL.



WHEN THE TUNNELS OF MINES IN WALES WERE FOUND TO EXTEND UNDER THE SEA THE NAME SEACOAL BECAME MORE COMMONLY USED. WHEN BROUGHT TO AMERICA BY BOAT THE TERM "SEACOAL" WAS FIRMLY ESTABLISHED.

A FAR CRY FROM MANY OF TODAY'S MODERN DUST-FREE FOUNDRIES, COALBROOKDALE FOUNDRY, IN SHROPSHIRE, ENGLAND, CAST THE FIRST IRON CYLINDERS FOR STEAM ENGINES ABOUT 1740, USING SEACOAL IN THE MOLDING SAND.

STEVENS DUSTLESS KLEEN-AIR SEACOAL MIXED WITH MOLDING SAND MAKES CLEAN CASTINGS AND A CLEAN FOUNDRY. THE VOLATILE MATTER, LIBERATED WHEN HOT METAL ENTERS THE MOLD, FORMS A GAS CUSHION BETWEEN SAND AND METAL, AIDING PEEL OF SAND FROM CASTINGS.

TRY THIS TEST! FILL A GLASS JAR ⅓ FULL WITH STEVENS DUSTLESS SEACOAL. PUT ORDINARY SEACOAL IN A SECOND JAR. COVER THE JARS AND SHAKE VIGOROUSLY. REMOVE COVERS AND NOTE DIFFERENCE IN THE DUST CLOUD. STEVENS DUSTLESS KLEEN-AIR SEACOAL SHOWS ABSENCE OF DUST CLOUD.

IMPROVE FOUNDRY WORKING CONDITIONS

USE STEVENS DUSTLESS KLEEN-AIR SEACOAL AND KING KORE KOMPOUND

Better working and health conditions are big goals of the Foundry Industry today. When you see Stevens Dustless Kleen-Air Seacoal or King Kore Kompound, you not only greatly improve working conditions but you gain the high quality casting results so widely recognized when these Stevens products are mixed with molding sand.

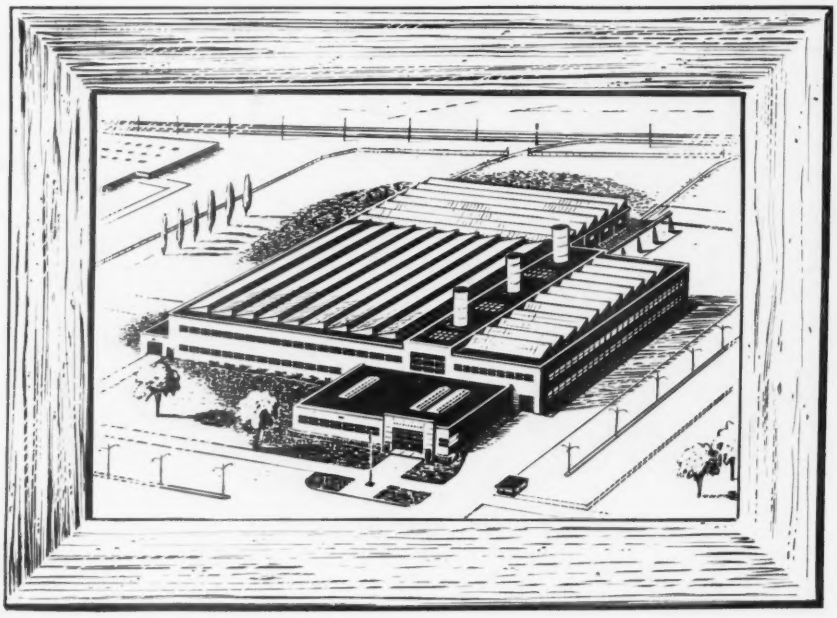
Stevens Kleen-Air Seacoal and Pitch Core Compound offer foundries many advantages: No dust floats in the air around workers . . . Less is lost since all of the powder goes into the mulled sand mix . . . There is less loss in sand reclamation systems . . . Handling and storage of the bags are cleaner . . . Casting finish is improved.

More and more foundries are using Stevens Kleen-Air Dustless Seacoal and King Kore Kompound. If you are interested in additional data on these improved products, write today for Stevens Technical Bulletin No. F-125 — "Stevens Dustless Facing Products" or Technical Bulletin No. F-103 — "Seacoal in Sand." Frederic B. Stevens, Inc., Detroit 16, Michigan.

BRANCHES: BUFFALO • CLEVELAND • INDIANAPOLIS
NEW HAVEN • DAYTON

IN CANADA: FREDERIC B. STEVENS OF CANADA, LTD.,
TORONTO • WINDSOR

FREDERIC B.
STEVENS
INCORPORATED
EVERYTHING FOR A FOUNDRY
DETROIT 16, MICHIGAN



where does BARTLETT-SNOW fit into your picture

complete new plant?
modernization?
expansion?
rehabilitation?

Engineered and custom built to meet your individual requirements, Bartlett-Snow foundry equipment automates handling, increases tonnage output per worker, and assures smooth, efficient, synchronized flow of materials from sand and metal storage to the shipping of finished castings. The initial investment is often repaid in from 8 to 15 months.

DESIGNERS
ENGINEERS

BARTLETT-SNOW
CLEVELAND 5, OHIO

FABRICATORS
ERECTORS

Foundrymen Who Know — Buy Bartlett-Snow

re

e?